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The Black Range District of Western Australia

A New Field Which Has Developed Quite Rapidly and Promises to Become Second in Importance Only to Kalgoorlie

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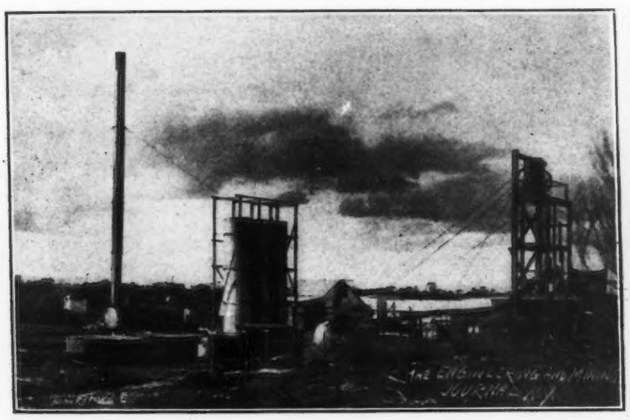
The township of Sandstone, which is the center of the Black Range district of the East Murchison goldfield, has sprung into existence during the last two years. The discovery and development of the rich mines in its vicinity has converted what but a short time ago was the camp of a few prospectors into a flourishing mining township with about 2000 inhabitants. A hospital, managed by a resident surgeon, has been built on the outskirts of the town, and is supported by subscriptions from the miners supplemented by a government endowment. The climate is healthy, although during the summer months the thermometer often registers 100 deg. during the day, but being far inland and at an elevation of about 1400 ft. above sea level, the air is dry and the heat not distressing.

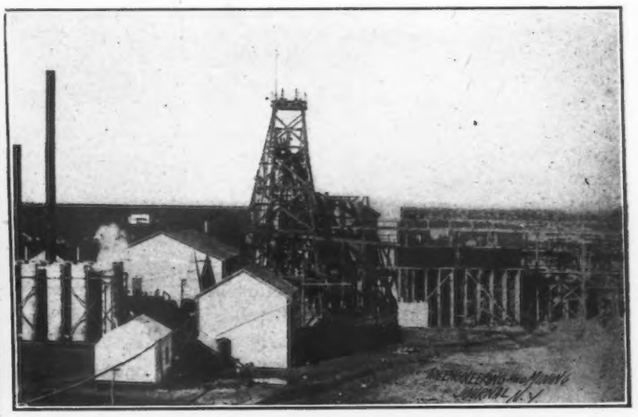
The chief difficulty is the want of water. Though the annual rainfall is fairly good, it all falls at one time and, the country being flat, soon sinks into the ground. There are no rivers or creeks worthy of the name in the district, and all water has to be obtained by sinking wells. These give a good supply, but the water contains a large quantity of mineral and, though usable, cannot be said to be good.

Long Wagon Haul to the Mines

Sandstone is best reached from Perth, the capital of western Australia, by traveling north, a distance of 306 miles, to Geraldton, a coast town, and thence almost due east to Mt. Magnet, 216 miles by rail. A railway is under construction from Mt. Magnet to Sandstone, but at present it is necessary to make this part of the journey by coach. Coaches run three times a week. Leaving Mt. Magnet at 2 o'clock in the afternoon, they travel until about 11 o'clock that night when a stop is made at what is called an "accommodation house" (differing from a hotel in that it has no license to sell liquors) until 5 o'clock in the morning. Sandstone is eventually reached about 5 o'clock in the evening, when the traveler alights stiff, sore and covered with dust after his coach ride of 105 miles. The scenery passed through is most monotonous, the road being practically level for the whole distance, and the country covered only by mulga, a species of scrub which grows to no size, and salt bush.



SANDSTONE DEVELOPMENT COMPANY'S NO. 1 SHAFT



OROYA BLACK RANGE COMPANY'S HEADFRAME AND PLANT

Camels, Donkeys and Horses Used for Freighting

All the machinery and stores required by the mines and the supplies for the township have to be taken over this road by teams. About 50 teams are on the road, composed of donkey, camel and horse teams. The donkeys are generally driven in a team of 17 made up of two in the shafts and the rest harnessed three abreast. They make a very pretty team, and can haul about 700 lb. per donkey. The camels are harnessed to the wagons in much the same manner as horses, with collars around their necks, and straps around their humps to keep the collars and traces in position. These animals were first imported for use as pack animals, but it is claimed that they can do better work as draft animals, and also that white men can handle them better than the Afghans, who were brought over to drive them. They are driven in teams of six or eight, and make an ugly looking team, but are able to draw about 1400 lb. per camel.

The horse teams draw about 2100 lb. per horse. The horse teams are the quickest, but have the disadvantage that they must carry feed for the horses, while the camels and donkeys are turned loose at the end of the day's journey to feed on the salt bush and herbage. The cost of freighting is from £5 to £6 per ton from Mt. Magnet to Sandstone with practically no back load.

Geology

The district being still in its infancy, not much is known about its geology. The surrounding country consists of a slightly undulating plain covered with a fairly dense growth of mulga, the monotony being relieved by the occurrence of what are locally called "breakaways." These consists of beds that have the appearance of being composed of sandstones and conglomerates, lying horizontally along the tops of some of the ridges. They are evidently the remnants of an earlier cementation of the surface of the country, which

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have resisted the subsequent denudations and now remain as flat-topped cappings to the highest ridges. They have weathered into peculiar shapes, but generally present clifflike faces.

The surface of the county is covered, to varying depths, by a layer of what is locally called "cement." This, apparently, has been formed by the decomposed country rock being bound or cemented together into a fairly solid mass by salts of iron, silica, magnesia and lime. This is doubtless caused by the evaporation, during the dry, hot spells, of mineral-bearing solutions drawn to the surface zone by capillary action.

The most prominent characteristic of this portion of western Australia is the enormous amount of silicification that has occurred during some former period of its geological history. Quartz in the form of segregations and blows appears in every direction, and one frequently drives for hours through stony flats where it would be no exaggeration to state that it would be impossible to lie down without resting upon a lump of white quartz. This universal occurrence of quartz, lying upon the surface of the cement, makes it exceptionally difficult to prospect the country, as even when a gold-bearing stone is found, there being practically no fall to the country, it becomes a Chinese puzzle to determine in which direction to sink through the overlying cement to prospect the settled country for the reef from which the gold-bearing quartz was shed.

Main Series of Fissures Runs North and South

At Sandstone there are clearly two main series of fissures or lode formations. One series strikes roughly north and south and dips to the west at an angle of about 35 deg. from horizontal. These reefs have every appearance of being what are usually called true fissure lodes and contain a filling of quartz which carries gold in a coarse form. It is this series of reefs that the three principal mines of the district, the Black Range Gold Mining Company, the Oroya-Black Range Company and the Sandstone Development Gold Mining Company, are working. The first named company is mining a reef locally known as "Hacks" and the last two upon the "Sandstone" line of reef, the Development company holding outcrop leases to the north and block claims to the west of the Oroya-Black Range Company.

This series of reef formation, as exposed in the workings of these three mines, has apparently been subjected to at least two periods of earth movement. A fissure was first formed along which quartz was deposited, and at some later date this fissure was reopened, suffering dislocation and some movement, when a fresh precipitation of quartz took place. This theory is formed both from the characteristics of the reef and the disposition of the filling.

The reefs have a habit of splitting at frequent intervals, thus forming hanging-wall and footwall reefs divided by much jointed and apparently moved country rock. Where the two reefs have combined to form one there are two classes of quartz easily distinguishable. One, locally called "beefy," is a banded quartz which generally carries the most gold, and the other a white vitreous quartz which generally appears to be unpayable. I am inclined to think that the banded quartz is the older of the two.

In the 470-ft. level of the Development company's workings a crosscut clearly shows a dike (not yet properly classified) striking and dipping parallel to the reef and having quartz on both sides of it, although where cut by the crosscut the larger body of stone was lying on top of the dike. I believe that this dike, or a similar one, has been exposed a long way to the south in the workings of the Oroya-Black Range company.

The East and West Series

One or two favorable prospects have been opened up on a series of reefs striking east and west. Although good gold has been found in places, these properties have not as yet developed into anything of importance. This formation differs from the ones running north and south in that instead of dipping at a flat angle they are practically vertical, and instead of having clearly defined walls they merge into the enclosing rock. They must be classified, I think, as impregnations along a line of weakness and are similar in appearance to many reefs in western Australia which were described by A. Gibb Maitland, government geologist, as "..... the ore bands of chalcedonic quartz and jasperoid rocks which are of such frequent occurrence in the colony and which contain payable gold in such widely separated localities as Black Flag, Mt. Magnet and Horseshoe." At Sandstone these reefs have not yet received sufficient attention or development to demonstrate this value.

Although Sandstone and the Black Range district generally has only been actively developed during the last 4 years, it is now looked upon as one of the most promising of the mining centers outside of Kalgoorlie. Its growth and importance are best shown by the official returns of fine gold won each year. Previous to Dec., 1903, the output was 1084 oz.; in 1904, 11,186 oz.; 1905, 16,693 oz.; 1906, 35,420 oz.; 1907, 57,947 oz.; 1908, 72,632 oz.

Two mines, the Black Range Gold Mining Company and the Oroya-Black Range Gold Mining Company, have supplied practically the whole of this output, the Sandstone Development Company being still more engaged with development than with production. The mining and treatment costs published by these companies show that they are doing good and efficient work especially when the rate of wages ruling in the district is taken into account.

The arbitration court's award determining the rate of wages to be paid in the Sandstone district from June 1, 1907, to May 31, 1910, was as follows, the figures being for a shift of 8 hours: Hand miners in shafts, 15s.; rises, 14s.; other work, 13s. 4d.; machine men in shafts, 15s. 4d.; rises, 14s. 10d.; other work, 14s. 2d.; mullochers and truckers, 12s.; men working in cyanide vats, 13s. 10d.; surface laborers, 11s. 8d.; timbermen, 15s.; drill and tool sharpeners, 14s. 4d.; engine drivers, winding, 15s. 8d.; engine drivers, stationary, 15s. Wet ground, ⅓ per shift extra. Overtime, first 4 hours time and one quarter, afterward time and one-half.

BLOCK RANGE COMPANY'S SHAFT, MILL HOUSE AND BATTERY

The Black Range Gold Mining Company

This is a Victorian company with its registered office in Melbourne, and was the first to be formed to work properties at what is now Sandstone. It started in a small way in December, 1903, and succeeded in paying its first dividend in January, 1905. Since that date the dividends have been regular. It was reconstructed in 1906 and now consists of 60,000 shares of £1 each, of which 7500 shares remain unissued. It is working a north and south line of reef, dipping to the west at an angle of 35 deg. The mine is worked by a main vertical shaft to the 300-ft. level, connected to the various levels by cross-

cuts, but below this level the mine has been opened up to the 450-ft. (vertical distance) level by a winze sunk on the dip of the reef from the main drive on the 300-ft. level. This necessitates a double handling of all stone won below the 300-ft. level, a costly operation. The directors appreciate this and have under consideration the sinking of a new shaft.

From the collar of the vertical shaft the ore is trucked to the battery bins, which feed a 20-head mill. The sands are cyanided in galvanized-iron tanks, the tailings being carted away in tip drays. The slimes are still being stacked. The plant is an ordinary one, and calls for no special mention.

Since December, 1903, a total tonnage of 55,027 tons has been treated for a recovery of 61,870 oz. of fine gold by the battery, and 37,511 tons have been cyanided for a return of 17,146 oz., or a total production of 79,016 oz. of fine gold. Dividends amounting to £97,812 have been paid. These figures are up to the end of December, 1908.

The costs published by the company for the work done during the half-year ending December, 1908, are as follows: Mining, 11s. 5.4d. per ton; crushing, 3s. 8.2d.; hauling and pumping, 4s. 2.8d.; general expenses, 2s. 3.3d.; plant expenditure, 2s. 3.7d.; development, 9s. 8.8d.; total, 33s. 3.7d.; development, 9s. 8.8d.; total, 33s. 8.2d.

The cost of driving averages about £4 per ft., being given as £3 7s. per ft. on the 300-ft. level, and £4 5s. on the 450-ft. level. It is natural to expect the cost of driving to increase as the workings deepen, but in this case I think a large proportion of the increase shown must be attributed to the double handling of the stone already mentioned. Rising costs about £1 12s. per ft. The great difference between the cost of driving and rising is largely due to the fact that the rises are often put up under the reef while the drives are driven in the reef itself.

The Oroya-Black Range Company

This is an English company, an offshoot of the Oroya-Brown Hill Company, and was formed in 1906 to purchase from the Oroya-Brown Hill Company a number of gold-mining leases on the outcrop of the Sandstone line of reef. The Oroya-Brown Hill Company had secured options on these leases, and, after having expended some time and money in proving the value of the property, formed the present company to work the leases.

The company, under the management of Bewick, Mireing & Co., has developed its mine well, and has erected a compact and well designed plant. The main shaft is an underlay one, and the ore is hauled in self-dumping skips which feed direct to the rock breaker. The broken ore is distributed along the battery bins by a grasshopper conveyer. The ore is crushed in a 20-head battery, using 1275-lb. stamps, and, after passing over copper plates, is elevated by a tailings pump to the sand separators. The coarse sands are returned to Forwood-Down regrinding pans, and, after being ground, return to the sand separators. The overflow from the separators is laundered to the cyanide plant.

Cyanide Practice of Oroya-Black Range Company

The cyanide plant consists of two traveling collecting vats, fitted with Butters distributers, carried on a superstructure over the treatment vats into which the collected sand is dropped. This arrangement, though pretty in theory, must have greatly increased the cost of the plant, especially in a locality like Sandstone, where all the building material required has to be brought a long way by rail and 105 miles by team, none of the local timber being suitable for building purposes. I fail to see that the advantages gained are sufficient to warrant this increased expenditure.

The treated sands are discharged through the bottom of the vats into trucks which are hauled by a friction hoist to the top of the dump. This is necessary on account of the flatness of the country. The slimes overflowing from the collecting vats, after being partially thickened in a set of spitz-kasten, made of sheet iron, are treated in a vacuum slime plant. The thickened slime is first dewatered by the vacuum plant and the cakes, being mixed with cyanide to the required thickness, are after agitation again treated by the vacuum plant.

During the year ending Aug. 31, 1908, the battery ran 93 per cent. of the whole time with an average duty of 7.22 tons (2000 lb.) per 24 hours. The costs were as follows: Mining, 15s. 10.3d.; treatment, 8s. 2.6d.; realization of bullion, 9.2d.; amount charged to development, 5s. 6.1d.; total, 30s. 4.2d.

The ore treated is free milling, and the gold, being largely coarse, is readily amalgamated. For the year ending Aug. 31, 1908, 29,192 oz. of fine gold were recovered, equal to 50s. 4d. per ton milled, of which amount 36s. 7.8d. per ton (72.7 per cent.) was recovered by amalgamation. The total extraction obtained is given at 96.6 per cent., the residues published for August being sand residues, 1.56s. per ton, and slime residues, 1.01s. per ton. Until the end of 1908, the company had paid £25,000 in dividends, and a dividend has been declared payable in June, 1909, amounting to £15,000, making a total of £40,000 in dividends.

The Sandstone Development Gold Mining Company

This company was formed in Sydney in 1906 to develop some block leases taken up west of the Oroya-Black Range Company's leases and also some outcrop leases to the north. Steady development work has been carried on, and up to the present the work done has been practically all of this nature. The work done having proved that the ore continued to be of a paying grade at depth, the directors are now erecting a 10-head mill to treat the ore from this mine. Up to Jan. 31, 1909, this company had crushed at the Government battery 3123 tons (2000 lb.), containing gold worth £17,800, or an average value of 114s. per ton. This stone was won chiefly from development work, and was crushed partly to provide funds and partly to give bulk samples of the stone exposed to check the sampling. When this company commences crushing with its own plant it is expected that the results will be as satisfactory as those of its neighbors.

DONKEY TEAM

CAMEL TEAM

Mining properties in Mexico are frequently apportioned in *barras*, or twenty-fourths.

Sources, Treatment and Prevention of Malaria

Introduced into the System by Infected Mosquitos. Quinine a Specific in Treatment and Should Be Taken As a Prophylactic

BY DR. F. A. CHESTER* AND C. C. SEMPLE†

Plasmodium malariæ are protozoans, not bacteria. They are introduced into the system by infected mosquitos of the genus Anopheles. Inhabiting the red blood corpuscles, they first appear as amoebulæ, growing to fill the interior of the cell, living upon the red coloring matter. Upon reaching maturity they undergo segmentation each segment taking the appearance of a pigment spot surrounded by protoplasm. The corpuscle then breaks, liberating the spores, pigment and toxins into the blood serum. Each spore then enters a new corpuscle in which it goes through the same sporulating cycle as the parent. The effects of the sporulating process and liberation of toxins into the blood are manifested in the symptoms of malaria, known under the various names of chills and fever, ague, intermittent, remittent, pernicious, breakbone, black-water, malarial fevers and dengue.

Classification of Types of Malaria

The malarial parasites were investigated by Laveran about 30 years ago and within the last 10 years much has been added to the physician's knowledge of the malady. The time of rupture of the corpuscles is marked by the malarial paroxysm or chill and fever stage. The paroxysms show a marked periodicity in their recurrence, varying both in character and intensity. A classification of the types of malaria has been made upon the basis of frequency of recurrence: quotidian malaria, in which the fever attacks every day; tertian malaria, in which the fever comes every other day; quartan malaria, in which the return is every fourth day; aestivo-autumnal malaria, the usual tropical variety; pernicious fever, in which the fever persists; and bilious fever accompanied by severe headache and over secretion of bile. Specific organisms for tertian, quartan and aestivo-autumnal fevers are recognized, each of which has been uniformly found occurring with its definite type of infection. The parasites of tertian and quartan fever exist in the blood of infected cases in larger numbers, practically in the same stage of development; and all sequent at about the same time. Hence the regularity of their recurrence, when uninfluened by quinine administration. Seven-day intervals frequently occur between paroxysms where quinine has been given in tertian and quartan fever. The irregularity of the fever in the aestivo-autumnal form is accounted for by the frequent presence in the blood of groups of organisms, in various stages of their cycle of development. This is the most serious form of malarial infection and the prevalent one in the tropics. When the maturing groups of parasites closely follow each other we have the pernicious type of aestivo-autumnal fever developed.

Diagnosis Difficult

The diagnosis of malaria should be left to competent physicians whenever possible because the first stages of yellow fever very closely resemble the malignant types of malaria and the treatments differ diametrically. Microscopic examination of the blood to identify the malarial parasite is the surest method of diagnosis but even this may fail to reveal the presence of the organism, unless the sample be taken at the time of paroxysm or if quinine has been previously administered. The parasites become lodged in the spleen and during intervals between attacks may disappear from peripheral circulation. Where medical attendance is not available, the prevalence of the malady in the district may be more or less relied upon, but if unknown in the locality, it is possible that the complaint is not malaria and medical assistance should be obtained even at the cost of having to leave the field until a cure is established. This point should be particularly observed in the tropics where outbreaks of yellow fever are possible.

Symptoms—Fever Not Always Noticeable at Once.

Unless checked, the sporulating process may continue indefinitely. It does not necessarily follow that a person inoculated through mosquitos should develop the symptoms of malaria at once. If one is in good health the first attacks may not be manifested in any way that the victim is aware of; a strong constitution can withstand the attacks for a while, but as the blood becomes anemic and filled with toxin the effects become noticeable. At first the victim feels unnaturally drowsy, disinclined to work or exert himself in any manner, often with more or less severe headache although headache is frequently entirely absent. Slight aching of the joints and soreness of the muscles with facial neuralgia are often attendant. There may be intervals of fever preceded by a chill or merely a flushed feeling over the entire body. In early attacks the chills are often entirely lacking. The more violent symptoms felt when the malady has secured a firm hold are at first a sensation of heaviness about the limbs, headache or none, with aching of the joints and soreness of the muscles. Then rapidly develops a sense of numbness, the finger nails turn blue, the skin is *y* and feels parched, the patient feels cold though his temperature may be above normal. Chills which may be very violent then follow with chattering of the teeth, appearance of goose-flesh over the body and violent muscular contractions. The chill is rapidly followed by fever with or without excessive perspiration. The change from chill to fever stage is often marked by a period of severe and exhausting vomiting; bile, mucous or nothing whatever may be thrown off the stomach. The fever when attended by perspiration usually brings the patient a sense of relief. When the fever breaks the patient will ordinarily fall asleep for a few hours, awakening with a sense of weakness alone remaining as a memento of the attack.

After repeated attacks the spleen usually becomes enlarged and may be felt to the left side just below the floating ribs. Diarrhœa or dysentery often accompany malaria and yield to malarial treatment. An over secretion of bile is usual, and the kidneys and bladder may be affected. Hemoglobinuria or coloration of the urine by hematin, derived from destroyed red blood cells excreted by the kidneys is not at all uncommon and is not an alarming development. Hematuria or hemorrhage of the urethra, bladder or kidneys marks the "black water" fever and though a grave symptom is not necessarily indicative of a fatal termination of the attack. It is frequently the case that instead of the usual chills, severe facial neuralgia accompanied by headache mark the paroxysms and in neuralgias where marked periodicity is observed as well as many tropical forms of dysentery the origin is malarial and they yield to vigorous antimalarial treatment.

Pernicious Type

If neglected the recurrence of malarial attacks become more frequent and intense

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and the symptoms characterizing the pernicious type may develop. While under the surveillance of skilled medical practitioners the majority of cases of pernicious fever result in recovery, the mortality is high as compared with the other forms and the development of this type calls for immediate and vigorous treatment The symptoms are persistence of the fever with exceptional high temperatures; a comatose or semi-comatose condition may prevail, accompanied by twitching of the muscles of the legs and arms, the breathing becomes loud and stertorous, the tongue dry, no diaphoresis is induced by antipyretics and a rigidity of the muscles of the jaws and face resembling tetanus is observed. Death may ensue in from 24 to 48 hours after the beginning of the attack. The comatose type never runs a long course, 48 hours being the exceptional length; either death or relief usually comes within the first 30 hours.

Treatment of Ordinary Malaria

In the treatment of malaria quinine is a specific. Two modes of employing it have been suggested: First, the remedy is withheld until after the administration of emetics and purgatives, or in remittent fever, until, by diaphoretics and baths, a distinct remission is produced; second, to give immediately 10 to 20 grains or even more twice or three times daily. In remittent fever, the antipyretic effect of large doses is relied upon to bring down the temperature.

In our own experience we have found the following treatment most efficacious: Immediately upon feeling the chill coming on the victom should go to bed, be covered with as many heavy blankets as may be comfortable to him and hot water bottles be placed at the feet, pit of stomach and back of the neck. Massage over the entire body with some stimulating liniment often gives comfort. Antipyretics as acetanilid, antifebrin or phenacetine may be given at once in a dose of 10 grains. If after giving the acetanilid and having followed the dose by quinine and a sufficient time having elapsed for the quinine to exert its influence, the temperature still remains high, repeating the dosage of acetanilid at two or three hour intervals until three doses have been taken, will often bring the temperature to normal. A safe form of using acetanilid is the compressed tablet put up by Parke, Davis & Co. according to the following formula: Acetanilid, 3½ grains; sodium bicarbonate, 9-10 grain; sodium bromide, 1-10 grain; caffeine citrated, ½ grain. The tablets are best pulverized before use and two constitute the average dose. Antipyretics tend to shorten the time of chill which is the most exhausting stage of the attack, hasten the stage and intensity of perspiration and reduce the temperature. Their effect is generally noticeable twenty minutes after administering. Indiscriminate use of them in repeated doses is however, unsafe, without a physician's direction.

Should severe vomiting occur it is best to aid the stomach in removing the obnoxious material by administering emetics and following their use by a stomachic sedative. To this end 30 grains of powdered ipecac may be given, followed by copious drafts of tepid water, then about 20 minutes later or as soon as the stomach is empty relieve the retching and quiet the stomach by giving five grains of cerium oxalate and five grains of sodium bicarbonate in powder form or in gelatin capsule. Ice or cloths wrung out in cold water held in the hand and mouth tend to relieve vomiting.

Use of Quinine

As soon as perspiration has been induced treatment with quinine should be begun. Quinine has no effect if not given four hours previous to the sporulation of the parasites. It should be given as soon as possible after the attack to insure there being quinine in the circulation before another batch of organisms hatch out. Quinine is an absolute specific for malaria and the parasites cannot live when it is present in the blood. As soon as the fever breaks, from 10 to 20 grains of quinine are given, followed by a drink of hot lemonade. A wine glass of neat whisky stimulates circulation and tends to get the quinine into the blood more quickly but ordinarily the use of alcoholic stimulants is not at all necessary and it is better for the patient not to use whisky at all. The dose of quinine is repeated three times daily, sufficient being given at a time to induce slight cinchonism. The administration of quinine in quantity in excess of that needed to induce moderate dizziness is not attended by more effectual results in the ordinary forms of malaria.

Calomel Necessary in Large Doses.

As soon as the stomach can stand it, calomel should be given. In tropical malaria the small doses of calomel as used in the north have very little beneficial effect. Ten grains of calomel mixed with an equal weight of sodium bicarbonate is the average dose. To avoid the griping pains attending the use of calomel the dose may be divided in four parts, giving one-quarter at half-hour intervals. Compressed tablets, each containing 2½ grains of calomel and sodium bicarbonate is a convenient form in which to administer the drug. Five hours after exhibiting the last dose of calomel an ounce of citrate or sulphate of magnesia dissolved in water should be given, and this followed within two hours by a large dose of quinine, 15 to 20 grains. If the quinine is not administered directly after the effects of the calomel are noticed, much of its beneficial action is lost. Quinine is then given two or three times daily to the amount of 30 or 40 grains per day until the third septenary period has passed without a recurrence of the attack. The night after taking the calomel three to four ¼-grain granules of podophyllin should be given. The patient should remain in bed for at least 10 days after the last paroxysm; little can be effected in the way of cure if the patient insists upon getting up and dragging himself about. Rest in bed is essential to prompt and thorough cure.

The treatment with quinine should be faithfully continued until three weeks have elapsed without recurrence of the fever. Arsenic may be given with favorable effect where quinine fails or when the patient is anemic. The effect of the arsenic is to stimulate the formation of fresh blood corpuscles and it probably acts upon the spleen; its action on the system is not very well understood, but its value in the treatment of remittent fever and chronic malaria has long been recognized. It should be given in ascending doses commencing with five drops of Fowler's solution to be augmented by one drop per dose per day, to be taken after each meal until puffiness of the eyes betrays the arsenical impression, after which its use may be discontinued. The dosage should not be increased beyond 15 drops three times per day. Fowler's solution is a most convenient form in which to take arsenic as the dosage can then be increased at will. Arsenious trioxide compressed tablets may also be used: Two 1-60 grain tablets to be taken after each meal. In anemia the use of iron is indicated and may be administered as Blaud's pills, 2½ grains each of iron carbonate and sodium bicarbonate; two pills to be taken after each meal. The iron supplies the necessary iron constituents for blood formation. In chronic malaria and especially when accompanied by kidney and bladder complications we have found the use of methylene blue most efficacious. It is given in one-grain doses three times per day.

In summing up, the treatment for malaria consists in taking from 10 to 15 grains of quinine at 10 a.m. and 4 p.m. following the dose with a drink of hot lemonade and if bladder and kidney complications are present, one grain of methylene blue after each meal. Arsenic is taken three times per day, preferably after meals, but not while methylene blue is being used. The Blaud's pills are to be taken thrice daily at the same time as taking the arsenic.

The use of quinine hypodermatically is not advised, as painful ulcers almost always follow such mode of administration. In pernicious fever the hypodermatic use of quinine in large doses, 10

to 15 grains, is indicated. The dose should be repeated at four-hour intervals and intense cinchonism established. Either the bi-sulphate or quinine and urea hydrochloride are used hypodermatically.

Forms in Which Quinine May Be Taken.

There is a choice in the various salts of quinine that may be used. Ordinarily the sulphate is prescribed. The active principle is the base cinchonidine and, other things being equal, that salt containing the greater percentage of base will for like weights be most efficacious. Taking the active base in quinine sulphate as 100, the relative values of the more common salts are as follows: Quinine sulphate, 100; quinine bi-sulphate, 79.6; quinine hydrochloride crystals, 110.0; ditto dried, 122.0; quinine, acid hydrochloride, 100.7. However, the solubility of the salts is to be considered above the quantity of active base. The sulphate dissolves in 720 parts water; the bi-sulphate in 8.5 parts; the hydrochloride in 18 parts and the acid hydrochlorides in less than its own weight. The sulphate is probably the most extensively used, but on account of its relative insolubility the use of any of the other three salts is very much to be preferred. The various salts may be used indiscriminately.

Much depends upon the form the quinine is in when taken. The stomach, weakened by the attacks of fever and disordered state of the intestinal tract, allow the more insoluble salts to pass through the system without being completely absorbed. Hard pills, sugar-coated or gelatin-covered, and compressed tablets are apt to pass through intact. Compressed tablets are convenient for carrying but should be pulverized before taking. By wrapping the powder in cigarette paper the dose may be taken without tasting. Quinine tannate is almost tasteless, but too insoluble for advantageous use. If tablets are to be used the bi-sulphate or hydrochloride are to be preferred. Quinine and urea acid hydrochloride are convenient forms of taking quinine. The combination comes in compressed tablets of five grains and are so soluble that they may be taken without pulverizing and to prevent being tasted should be wrapped in rice cigarette paper. These tablets also have the advantage in their being suitable for hypodermatic use when required.

A convenient manner of taking quinine in solution is to dissolve 40 grains of the hydrochloride in 1 oz. of compound licorice mixture, when one teaspoonful will equal five grains of quinine. The licorice tends to mask the taste of the quinine and taking the remedy in solution insures its being rapidly and thoroughly assimilated. The taking of hot lemonade after quinine is to be recommended as it takes away the bitter taste following the use of quinine and tends to aid the absorption. (We have noted that the continued use of quinine generally results in abnormally low temperature.) The diet is not important and one may be governed by his appetite.

If the above outlined treatment is followed from the beginning of an attack one never need fear the development of pernicious symptoms and any fever that is continuous under it for more than four or five days is not malarial. In enlargement of the spleen painting with tincture of iodine is beneficial, while arsenic is prescribed internally at the same time.

Prevention of Malaria.

The frequency and intensity of malarial attacks have a close relation to the rainfall and other meteoric conditions. The attacks are more frequent and severe in wet weather than in dry; and changes from one prevalence to the other are always marked by increases of the number of cases. There is a very widespread belief that blacks are less subject to malarial infection than whites and that natives are more or less immune to attacks. This is not in accordance with our observations. We find that natives living in the district, and having lived therein all their lives, are just as subject to attacks as others and that negroes not only are just as liable to attacks but usually develop the most aggravating cases. White men, according to our experience suffer the least both in regard to frequency and intensity of the attacks. This is probably in part due to the greater care that white men will take to prevent infection. The close relation of malarial outbreaks to rainfall is attributable to two causes, first, the area of breeding ground for the mosquitos is largely increased, and second, exposure all day to rain and wet makes the system less competent to resist attacks. It is also generally believed that repeated infections gradually permit the tolerance of the poison or partial immunity but according to our experience where quinine is not used prophylactically there is no such immunity. The use of three grains of quinine daily as a preventive, is practiced by the Army Medical Corps in their work among laborers on the Isthmus.

Views of Other Authorities.

Regarding the prevention of malaria the following is a synopsis of a paper read by Dr. H. R. Carter, "Director of Hospitals," at a meeting of the Isthmian Medical Society.

A. Prevention of breeding of mosquitos (Anopheles).

1. Destruction of breeding places by filling or draining marshes (even brackish water), clearing the banks of streams to prevent eddies, etc.

2. Destruction of larvæ. (a) Crude oil on the surface of water. This is a difficult measure to carry out thoroughly as wind blows oil to one side and clears certain areas; also it is difficult to get oil in the midst of reeds, rushes, etc. (b) Planting fish; mosquito larvæ are closely associated with algæ, which protects them or furnishes food.

B. Prevention of mosquitos becoming infected:

1. By screening the sick.

2. By thoroughly treating the sick with quinine.

These measures are ineffectual because it is impossible to screen natives. Apparently healthy children and even adults, harbor the parasites, and quinine does not kill the sexual forms of the parasites which infect the mosquito.

C. Prevention of infected mosquitos getting at well persons.

1. By having houses at a sufficient distance from breeding grounds. With foliage to protect them from the heat of the sun (which quickly kills them), anopheles travel very far; some think that with the wind they may go ½ to 1 mile at one flight. Houses should not be nearer than 1 mile to the breeding places and when possible should be placed on hill tops.

2. By keeping the foliage for several hundred yards around habitations cut.

3. By screening houses thoroughly and using mosquito bars, and staying indoors at night. Mosquito bars are rather ineffectual compared with wire screening of galleries, which is probably the most important of all measures. A screened vestibule should admit one to the gallery.

D. Prevention of infection if infected mosquitos succeed in biting.

This brings up the question of prophylactic quinine, a subject upon which various observers differ. I have no doubt that 6 to 10 grains of quinine taken regularly every night will prevent a large number of infections. One quickly gets accustomed to these doses and does not feel any effect, nor do I think any bad effect occurs. I have not faith in smaller doses, and I have seen a number of infections occur in persons who had taken 10 grains daily for weeks.

Doctor Carter said that there were a number of measures, any one of which, if thoroughly carried out, would be protective, but as it is practically impossible to reach perfection along any one line, use has to be made of many measures, each supplementing another.

Quoting from a pamphlet on "Yellow Fever and the Mosquito," a reprint of an article by J. H. White, M. D., Surgeon, U. S. Public Health and Marine-

Hospital Service, New Orleans (that appeared in the Dec. 26, 1908, issue of the *Journ. of the Amer. Med. Assoc*):

"Stegomyia callopsus and the culex pungens are both practically domestic animals—the stegomyia or yellow fever mosquito prefers clean water for breeding grounds, but the culex pungens, malarial mosquito . . . . breeds in identical situations, and, in addition, also breeds indiscriminately in any kind of water which may be available. . . . . The anopheles prefer swampy breeding places and will choose stagnant scum-covered water under the shade of trees and shrubbery if given a chance to do so. From this point they migrate, after hatching, to some clump of dank grass or shrubbery near a house and from this point of vantage enter the house after nightfall in search of blood. They do not fly very high, and this fact gave ground for the old idea that houses built high were safer in malarial countries because noxious miasms kept close to the earth. It has been said that the second stories of the old days were practically exempt from malaria and the third entirely so. Personal experience has shown that anopheles are vastly more numerous on the ground floor than above."

In our own experience we have found that clearing the shrubbery for 200 yards about habitations has materially reduced the frequency of attacks and though we have no experience with multi-storied houses, the hill tops are always points over which strong winds prevail against which the mosquitos will ordinarily be unable to fly, or else they prefer strata of comparatively quiet air. In the prophylactic use of quinine we have found doses of 10 grains given every day at 10 a.m. and again at 4 p.m. to secure absolute immunity. The quinine may be restricted to use say the first four days in the week, omitting the dose the balance of the time. We do not find that the constant use of 20 to 30 grains of quinine three or four days in the week is attended by any bad effect. Instead of inducing nervousness our experience leads us to believe that it has the opposite effect. It is very difficult to get natives and even many intelligent white men to use quinine constantly. They seem to think the constant use of a drug must necessarily be attended with some evil effect and that habitual use of the remedy lessens its curative properties at times of malarial outbreaks. Unlike some drugs the constant use of quinine does not call for correspondingly increased dosage when it has been used prophylactically. We have also observed that the outbreaks come as epidemics or malarial storms; either there is little sickness in camp or else there are many cases. These "waves" of attack differ from one another in some specific feature; prevalence of headache characterize some; pain in the back, others; or abnormally low temperature following fever.

As a further preventive against malaria we suggest the planting of eucalyptus globulus. In South Africa and Italy, the planting of these trees, which grow rapidly, has been attended with complete disappearance of the malady. It is also a well known fact that advancing civilization drives malaria before it.

Steel Corporation Production

The American Iron and Steel Association has prepared a table giving the production in 1908 of iron ore, coke, pig iron, steel ingots and castings, finished rolled iron and steel, wire nails, and tin plates and terne plates by the United States Steel Corporation, as compared with the production of all other interests; also the same comparison as to shipments of iron ore from the Lake Superior region. This table, slightly condensed, is as follows:

	Steel Corporation.		Others.	
	Tons.	Per Ct.	Tons.	Per Ct.
Shipments of Lake ore	14,579,613	56 0	11,435,374	44.0
Total prod. of iron ore	16,662,715	46.3	19,320,621	53.7
Coke made	8,169,931	31.3	17,863,587	68.7
Spiegel & ferro	115,344	75.8	36,674	24.2
Pig iron	6,819,064	43.2	8,964,036	56.8
Bessemer steel ingots	4,055,275	66.2	2,061,840	33.8
Open-hearth ingots	3,783,438	48.2	4,053,291	51.8
Total steel ingots	7,838,713	56.1	6,114,771	43.9
Bessemer rails	795,713	58.7	558,523	41.3
Open-hearth r'ls	260,580	45.9	306,724	54.1
Total steel r'ls	1,056,293	55.0	865,247	45.0
Other rolled products	4,515,831	45.6	5,391,418	54.4
Tin and terne plates	386,718	72.0	150,369	28.0
Wire nails, kegs	6,529,718	61.2	4,133,254	38.8

The total of finished rolled products, including rails was 11,828,789, of which the Steel Corporation produced 5,572,124 tons, or 47.1 per cent., and other makers 6,256,665 tons, or 52.9 per cent. The table shows that the Steel Corporation produced in 1908 considerably less than one-half of the total production of pig iron and finished rolled iron and steel and over one-half of the total production of steel ingots and castings. All its figures include the production of the Tennessee Coal, Iron and Railroad Company in 1908. With the exception of rolled forging blooms and rolled forging billets, all unfinished and intermediate rolled products, such as billets, blooms, slabs, sheet bars, tinplate bars, muck bars, etc., are not included in the table. Nor do the figures include hammered car, locomotive, or other axles, anchors, shafting, hammered or pressed armor plate, and other hammered or forged products. For the first time in a table of this character open-hearth steel rails and tinplates are separately enumerated.

The Steel Corporation's development, large as it has been, has hardly kept pace with the outside production. Thus to compare 1908 with 1902, the corporation's first year, we find that its proportion of the total pig-iron production has fallen from 44.7 to 43.5 per cent.; of steel ingots from 65.7 to 56.1; of finished steel from 50.8 to 47.1. The only increase was in its proportion of the total iron-ore production, which increased from 45.1 per cent. in 1902 to 46.3 last year.

Iron Ore in Spain

Consular Agent A. E. Carleton, of the port of Almeria, furnishes the following information concerning the red hematite ore of the Spanish province of Almeria: The iron-ore resources of Almeria have long been known in the commercial world, but not until the production of the mines in the north of Spain began to fail, has any special attention been paid to the development of this region. Although its mineral possibilities are not yet fully appreciated, there appears to be a general opinion among mining experts, based on examinations and showings that red hematite ore of excellent quality is to be found in abundance and a great future is predicted for the industry.

The great drawback to the development of the mineral resources of Almeria is the lack of railways; the only line in the province, which passes through only one district, not being able to give transport to all the minerals extracted. There is a network of cables connecting the mines with the foregoing railway, and likewise narrow-gage roads belonging to private companies. There are also several cables which run direct to the sea.

The province of Almeria ranks fourth in the production of iron ore in Spain, the following statement showing the relative output in the several districts for 1907 in metric tons: Bilbao, 4,736,190; Santander, 1,437,707; Murcia, 1,033,022; Almeria, 844,676.

According to the U. S. Geological Survey, turquoise and turquoise matrix to the amount of 29,590 lb., with an estimated value of $147,950, was produced in Arizona, New Mexico, Nevada, and California in 1908. The 1907 value was $23,840. An odd stone recently cut in Los Angeles from a deposit on Ithaca peak, in Mohave county, Ariz., showed a blue letter Y of turquoise in a gray matrix, this cutting being made possible through the presence of a split turquoise veinlet. The stone was sent to a student in Yale University.

The stock exchange in Mexico City is called the *Bolsa* and is conducted somewhat on the plan of the "Curb" market of New York.

North Lake Concrete Shaft and Foundation for Steel Head Frame

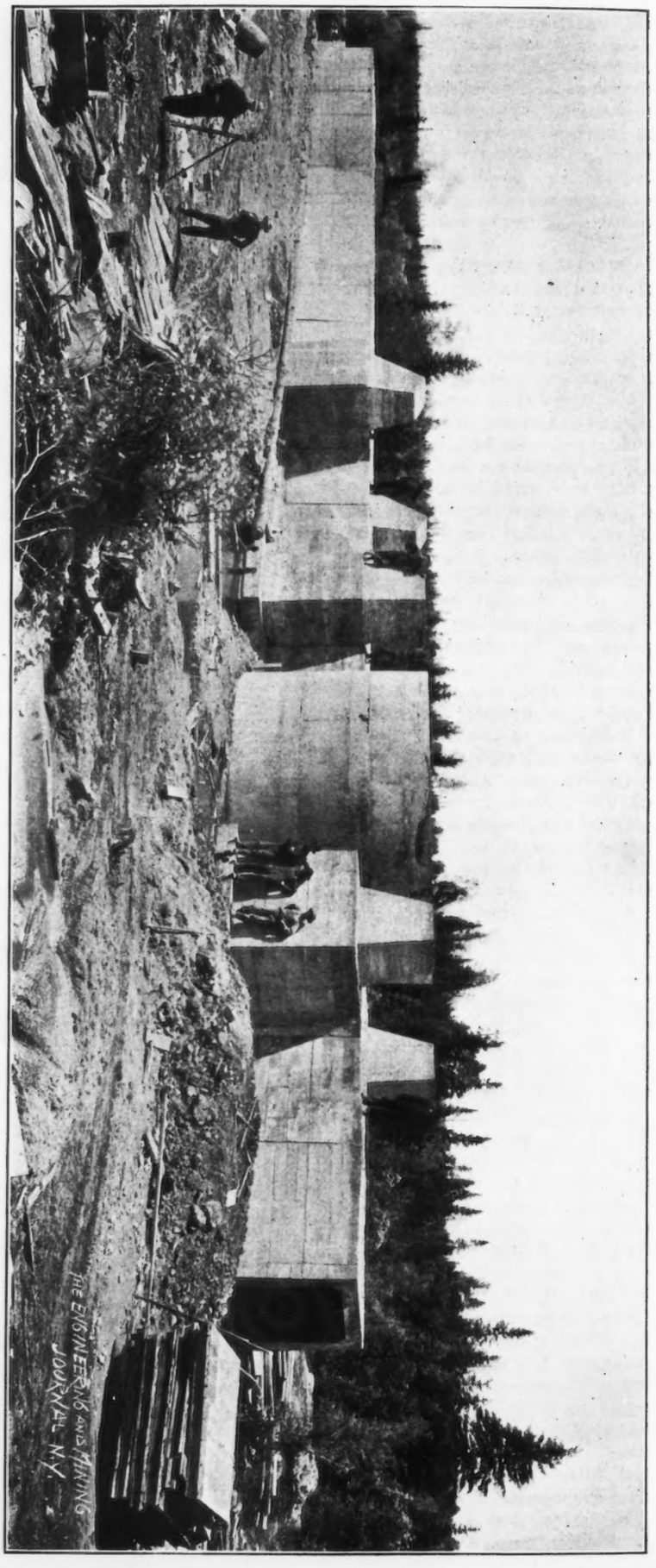
The accompanying illustrations show a concrete shaft, together with the head-frame foundation at the North Lake mine of the Cleveland Cliffs Iron Company, Ishpeming, Mich. The shaft itself is 20 ft. in diameter at the top and 17 ft. at the bottom, there being three 6-in. offsets in the sides of the shaft, which is 98 ft. deep. The shaft wall at the bottom is 3 ft. 6 in. thick, and 2 ft. thick at the top. The shaft was sunk, by the Foundation Company of New York, through quicksand to solid rock, from which point it will be continued to a depth of 500 or 600 ft. The shaft has five compartments, viz.: *a*, ladderway; *b*, for pipes; *c*, cage for men and timber, 6 ft. x 10 ft. 10 in.; *d*, skip-way, 4 ft. 3 in. x 5 ft. 5 in. The frame-work for shaft construction will be steel with wood guides, giving inside dimension of shaft, 14 ft. 10 in. x 10 ft. 10 in.

Tunnel

The tunnel shown in the illustrations is also built of concrete. The end at the right is to be used as a timber tunnel through which all the timber will pass from the yard to the shaft. The inside dimensions are 7x7 ft., with a 30-in. gage track laid in the concrete floor. This portion of the tunnel is 30 ft. long. The walls are 14 in. thick. The left end is 90 ft. long and is to be used as the entrance from the machine shop, engine room and dry house. All the drill steel, machinery and other supplies, except timber, will be sent to the mine through this entrance. An auxiliary tunnel will connect this main one with the dry house, so that it will not be necessary for any of the men to go out of doors when coming from work until they have put on dry clothes.

This structure is built on the edge of a swamp and beneath the tunnel portion is a cemented rock foundation 4 to 6 ft. deep, extending entirely across the tunnel and 1 ft. 6 in. on each side. The entire tunnel will be covered with dirt to a depth of 4 ft. This tunnel construction gives an entrance to the mine that does not in any way interfere with the loading of cars from the bins, or with surface works that are to be constructed above the shaft. The roof of the tunnel is reinforced with old steel cable, 7½ tons being used. All the joints between the sections of the forms are reinforced with 1-in. square iron bars about 3 ft. long. The remainder of the wall is not reinforced.

The "white copper" reported from Mulatos mine in western Chihuahua by the "Padres" is now known to be an alloy of tin and copper ores, which abound in some parts of the mine.



NORTH LAKE SHAFT NO. 1, ISHPEMING, MICH.

The Auriferous Antimony Ore of West Gore, Nova Scotia

By D. F. Haley*

The auriferous antimony deposit of West Gore, Hants county, Nova Scotia, occurs in a fissure vein in slates of lower Cambrian age. These slates are known as the gold-bearing series of Nova Scotia since practically all the gold which the province has produced has been won from the saddle reefs of this series.

Geological Conditions at West Gore

The slates at West Gore have been upturned to form a local anticline the axis of which strikes about east and west. The strike of the slates is not quite parallel to the anticlinal axis, being about N. 70 deg. E. with a dip of 45 deg. to the southeast. In the slates are many beds of quartzite locally called whin. The fissures, of which there are three, cut across both the slate and whin but the ore is found only in the slates. The fissures are parallel and strike N. 55 deg W., dipping to the southwest at an angle of 75 deg. Ore has been found in each fissure but has been extensively developed in only the middle one.

Vein Filling Material

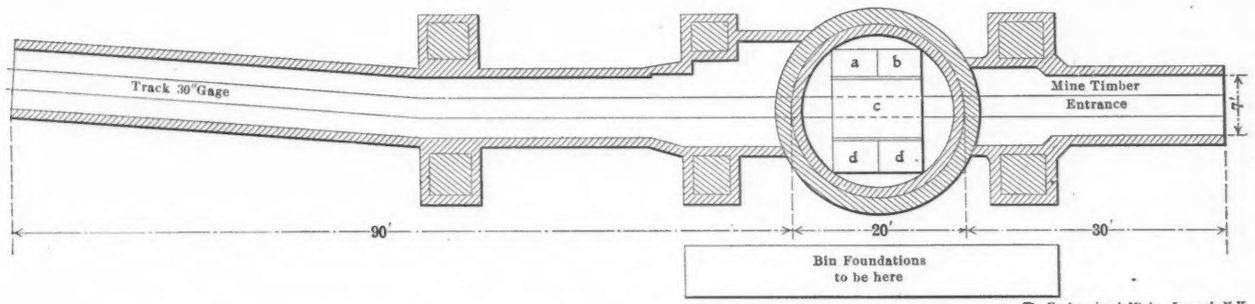
The vein filling is crushed slate, quartz and some calcite and carries as associated minerals stibnite, native antimony, pyrite, mispickle, kermesite (Sb_2S_2O) and a soft, reddish mineral occurring in the gouge which is probably metastibnite (Sb_2S_3). The hanging-wall of the deposit is smooth and well defined but there is no regular footwall. A gouge of varying thickness composed of finely crushed slate with thin seams of stibnite and the red sulphite is generally found between the ore and the crushed vein filling. The ore is ordinarily found on the hanging-wall side and occurs frozen to the hanging in lenses of varying length and thickness. The thickness of the lenses ranges from 6 to 24 in. of high-grade ore in the center, thinning out in all directions. These lenses are about 50 to 60 ft. in diameter and are arranged in the fissure in a certain definite shoot which pitches about 45 deg. to the east in the vein. When a lens has petered out, a few feet of drifting or raising will usually bring in another until the limit of the ore zone is reached. Outside of this zone of enrichrichment only small amounts of ore are found. The oreshoot is about 250 ft. long with the lenses arranged irregularly therein but persistent in depth. E. H. Faribault of the Canadian Geological Survey is of the opinion that the intersection of a certain bed of slates with the fissure was favorable for deposition and this is probably the cause of the arrangement of the lenses, for the enriched zone has the same pitch in the vein as the dip of the inclosing slates. There are no igneous or intrusive rocks in the vicinity nor are there any signs of thermal-spring action, the ore probably being formed from circulating waters deriving their metallic contents from below. The deposition along a certain bed of slates is probably due to the fact that this bed contained more organic matter or was more open, allowing other solutions to permeate it more easily than the rest of the strata.

It is interesting to note that deposition is still going on, for in a crosscut the face of which is about 100 ft. from the vein a small stream of water was encountered in the breast. The face of the drift is now partially covered by a thin skin of sulphide of antimony. The smell of hydrogen sulphide is very marked in this drift. The red sulphide previously noted as occurring in the gouge is soft and clayey and is also still forming. It may be that this latter phenomenon is due to water from the upper levels taking antimony into solution which is redeposited in lower levels (such action has been noted by Weed and others).

The native ore occurs throughout the ore zone as small stringers and in bunches of varying size; it is most abundant where quartz predominates as the vein filling. It often occurs as wirelike stringers in the stibnite ore. It has a silver-gray color. Iron pyrite and mispickle occur as small crystals shot through the slaty filling. The pyrite carries considerable gold, the slaty filling of the ore zone carrying about 0.15 oz. Gold also occurs in the free state in the slate, the stibnite and in the quartz. The lenses of stibnite are quite pure, carrying from 45 to 55 per cent. antimony and from 1 to 3 oz. gold per ton; the stibnite seems to be made up of a number of grains of ore cemented together by finely crushed slate. This intermixed slate is not always visible to the eye, but can be seen by a glass. This explains why the ore which looks to be pure only averages about 45 per cent. antimony. Sometimes the stibnite is found in thin radiating crystals in cracks in the quartz. Its color is steel gray but it weathers rapidly to a blue. Where the ore occurs in the form of lenses there is rarely any quartz filling in the vein at that point, but in some places the fissure is 7 ft. wide filled from wall to wall with white quartz through which run small veins of stibnite and bunches of native ore.

Development of the Property

The main shaft is 500 ft. deep and is sunk on the vein, levels being driven every 100 ft. and carried east and west to the ends of the ore zone. From the 500 level a winze was sunk about 260 ft. east of the shaft and was carried down in the vein to a depth of 370 ft., levels being driven at 600, 700 and 800 ft. from the collar of the shaft. These levels were still in ore.



OUTLINE OF CONCRETE TUNNEL

Overhand stoping is practised and no timber is used but that in the levels and chutes. The levels are timbered with spruce sets with 5-ft. centers. All chutes are carried through the stopes with 3-in. plank. Chute planks are framed on the surface so that when put together no nails are required, the filling holding them in place. Alternate chutes are made with ladderways. In starting a stope large stulls are first placed over the drift timbers normal to and hitched into the walls. The footwall end of the stull just touches the cap of the drift set. Poles are laid on these stulls. The gouge and slaty filling are then broken down from the ore to the hanging for a hight of 7 ft. and the length of the stope. This first slice of waste is dropped into cars on the level and hoisted or dropped into the level below for filling. As the ore is frozen solid to the hanging-wall it makes a good

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back to shoot to and is not disturbed until the waste is all removed. Planks are then laid down and pop holes put into the ore which, after being broken down, is shoveled into the chutes which have been started by this time. Chutes are placed at 25-ft. centers. The waste from the next 7-ft. slice is then allowed to fill on the poles, the chutes are carried through it as the filling rises, planks are laid and the ore shot down and shoveled into the chutes. By this method of mining no timber is required in the stope, the stope is always filled to within easy reach of the back and the men afforded a safe and sure footing on which to work.

On breaking through to the level above the drift-set, sills are caught up by placing a stull normal to the wall and just under it. From the footwall end a short piece of plank is wedged between stull and sill. These stulls are not hitched into the wall but are held in place by wedges. By this method the drift set is held firmly in place until filling has been completed.

In large stopes where a chute must carry a large amount of rock the chutes are lined with 1-in. maple boards. All ladders are made of 2x4 spruce with ½-in. round iron rungs. When a stope is worked out the ladders are removed and all chutes but the end ones filled with rock. Iron doors made of ½-in. iron, sliding in grooves (made by spiking 12-lb. T-rail to the chutes) and operated by a hard-wood lever 8 ft. long, are used on all chutes and are very satisfactory, being much quicker than rack and pinion or the usual board arrangements. These doors can be removed and used over and over again as the stopes are worked out.

Before the erection of the mill the ore was dumped on a floor and washed by a hose. Two men picked out the largest pieces of No. 1 ore and threw them into the cobbing house. The mixed ore and slate remaining on the floor was shoveled into a car and thrown on the dump.

All waste was dumped from a higher level and shot into a chute from which it was drawn into a car and taken to the waste dump.

The Crusher Plant

The ore is now run to the mill, hoisted to a 60-ton bin from which it is drawn by a circular ore-bin gate. Ater sliding over a grizzly set to 1½ in. the oversize falls onto a table 3 ft. long 30 in. wide, where it is washed; the good ore is picked out and dropped into the shipping bin. The remainder is worked forward with a short-handled hoe into a 10x16 Farrel jaw crusher set to 1½ in., the crushed product from which joins the throughs from the grizzly and goes to another 60-ton bin. From this bin an automatic-plunger feeder distributes the ore to a 16-in. belt elevator 65 ft. center to center of head and tail pulleys. This belt is a 7-ply rubber belt with a ⅛-in. reinforced cover with 14x7x7-in. malleable-iron buckets spaced 18 in. apart. Between the buckets and the belt small rubber valves of medium hard rubber are used. These are 1½ in. diameter and ¼ in. thick with a ¼-in. hole in the center to slip over the elevator bolt. The object of these washers is to eliminate the excessive wear which ordinarily takes place between the belt and cup from sands lodging there. With the above arrangement the sands that drop behind the buckets, as they turn over the head pulley, can run in the channels formed between the valves and several months are added to the life of the elevator belt.

This elevator delivers to a 12-ft. trunnion screen 36 in. in diameter. The first 8 ft. of this screen is covered with plate ¼ in. thick punched with ⅜-in. round holes. The last 4 ft. has ⅝-in. round holes. Oversize from this screen goes to a belt conveyer 30 ft. long. From this belt No. 1 ore and waste are sorted out. The belt is 18 in. wide and travels at 35 ft. per min. Ore left on the belt goes to a gravity screen with 1¼-in. openings. The throughs of this go to rolls, the oversize to an 8x10 Dodge crusher set to crush to ⅝ in. This material with the crushed product from the rolls goes to the 16-in. elevator before mentioned and to the same screen.

Concentrating Plant

The throughs of the ⅝-in. end of the screen go to a jig making concentrates and tailings, the tailings going to 15x20 Bacon rolls set to ⅜ in., and the crushed product to elevator and same screen. Throughs from ⅜-in. end of screen go to a 3x8-ft. trommel with ⅛-in. round punched holes, oversize to jigs making concentrates and tailings. Tailings are recrushed in a Huntington mill. Throughs of this trommel go to octagonal trommel 3x8 ft. covered by 12-mesh 19-wire screen of woven-wire cloth; oversize passes to jigs, throughs to spitzkasten. Spigot product of the first compartment of spitzkasten goes to classifier; the hutch goes to five jigs and is about 30 mesh in size. Overflow from classifier and other spigots of spitzkasten go to a King revolving screen with 100-mesh cloth. Oversize material passes to three Wilfley tables, undersize to settling tank and after settling to a 6-ft. Frue vanner. Middlings from Wilfleys together with hutch material from the five jigs is treated on a separate table.

All but the rough jigs are three-compartment machines with screens 24 in. wide by 36 in. long. Roughers are two-compartment with same size screens.

Features of Milling Operation

The picking table and belt recover 50 per cent. of the antimony in a coarse form carrying about 40 per cent. Sb and 1 oz. gold. Coarse jigs account for 30 per cent. of the antimony recovered in a product carrying 50 per cent. Sb and 1½ to 2 oz. gold. The fine jigs and tables recover the remaining 20 per cent., making a product carrying 40 per cent. Sb and 3 oz. gold. The smaller the size of concentrate the higher the gold value, but the arsenic contents also increase with the fineness; 80 per cent. of the ore recovered by the process carries less than ½ per cent. of arsenic. The presence of the gold in the fine concentrate is due to the fact that the mispickle of the slates and ore is very fine and not liberated until the ore has been crushed to about 20 mesh, but when liberated it is easily caught owing to its high specific gravity. It appears as a silver-white streak above the blue stibnite. This streak assays 15 to 25 per cent. As, 15 to 20 per cent. Sb and 9 to 11 oz. Au. Arrangements are being made to separate this material from the antimony product and handle it for its gold and arsenic contents.

Most of the native antimony is caught on the jigs, for a small piece of native ore attached to a relatively large piece of quartz would, owing to its high specific gravity, settle out with the stibnite. Some of the native ore is also found in the silver-gray high-gold streak on the tables.

The mill has a capacity of 100 tons per 24 hours and has treated successfully a 4 per cent. ore from the dump, making a saving of 80 per cent. of the antimony and gold. The milling plant has not been operating long enough to get exact figures of cost, but under normal conditions we figure the cost will not exceed $2 per ton of ore treated, including all charges. Fuel is hard wood and there is an assured supply for many years available. It costs $2.50 per cord at the mine. All ore is barreled for shipment. Barrels cost 30c. each when purchased from factory, but local merchants furnish a considerable supply of sugar barrels at 19c. each. Factory barrels hold 500 lb. mine ore or 700 lb. concentrates. Sugar barrels hold 800 to 1000 lb. concentrate.

A recipe for a non-shrinking alloy, to be used in duplicating patterns, is given as follows by *The Metal Industry*: Tin, 50 lb.; zinc, 50 lb. This gives a tough, hard metal that runs well if a good grade of zinc is used. The addition of 2 lb. of bismuth will render it even more fluid and enable it to be poured at a lower temperature. By using heavy sprues and pouring cold the shrinkage, which is slight, may be largely overcome.

In the remote districts of Mexico rebellious and high-grade gold and silver ores are being treated by cyanide at a large cost to avoid the greater cost of transport to railroad of the crude ores.

Equipment and Ore Handling at Cornwall Mine

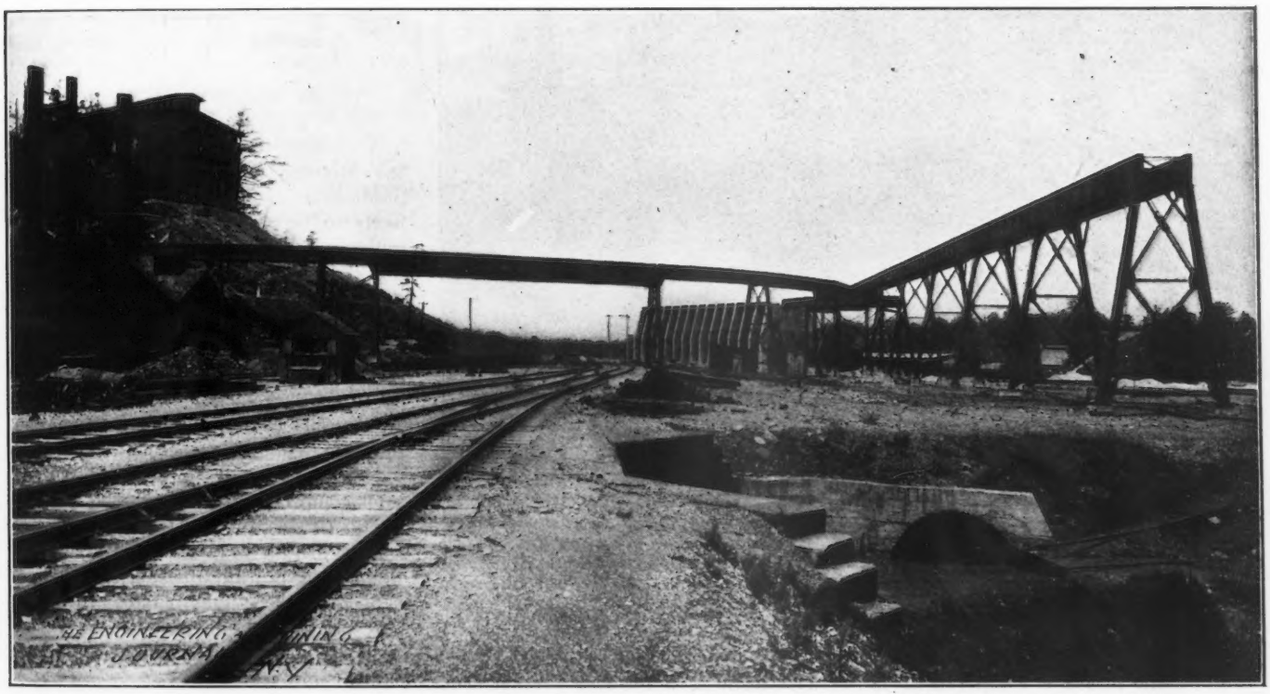
Ore Mined by Steam Shovels; Crushed in Pit; Handled in 50-ton Cars. Loading Pocket Holds 2500 Tons; Storage Capacity 30,000 Tons

BY QUINCY BENT*

Owing to the increasing depth of the workings at the Cornwall mine, Lebanon county, Penn., the steep track grades and in order to cheapen the mining of ore, it seemed wise to consider a new system of operation and to build such a plant as would best meet the required conditions.

It was decided to build a double skip incline on the footwall side of the mine, at the bottom of which should be located a pit pocket capable of taking the largest lumps that a 70-ton steam shovel would handle, and to crush at that point with a large jaw crusher in order to make the handling of the lumps less destructive to the bins, feeders and skips.

At the top of the incline was located the roll crusher and screening plant, from which the crushed ore is to be taken in a transfer car across a steel viaduct to the loading pockets which are located between the tracks of the two railroad companies. The steel viaduct and loading pockets, in course of construction, are shown in the accompanying illustration. It is intended to work the mine in 30-ft. benches with steam shovels dumping into 50-ton mine cars; these cars to be self cleaning and side dumping, with mechanically operated gates, and being shifted with steam locomotives to the dumping place over the pit pocket. Special provisions are made for handling large lumps of ore and getting these to the 60x42-in. crusher with the minimum difficulty, a Mason roller 9 ft. in diameter being used to feed the crusher. Small bins are placed between the various steps in the operation to provide leeway and insure as far as possible continuous operation.



VIEW OF SURFACE WORKS SHOWING STEEL VIADUCT AND YARDAGE FACILITIES

After passing the crusher, set at 16 in., the crushed material rejoins the stream, which has been roughly separated by means of a space back of the feed roller, in a 100-ton double-roller pocket which feeds either skip car.

The whole structure of the pit pocket, 70 ft. high, is entirely self-contained and can be slid down the footwall as the depth of the mine increases.

The crusher was designed by E. C. Bacon and built by the Farrel Foundry and Machine Company, the important parts being steel castings of generous dimensions. A 150-h.p. motor drives the crusher.

Hoisting Arrangement

The skips travel at a maximum speed of 600 ft. per minute on a 45-deg. incline with a load of 10 tons. The hoist is operated by a 500-h.p. direct-current motor, the starting, accelerating, slowing down and stopping being accomplished by automatic electric control. The skip will be arranged for hoisting water in flood times. As long as the mine footwall continues at 45 deg., the skips will be run balanced; but when the slope changes to 30 deg., as will be the case in several years, another 500-h.p. motor will be added to the hoist and the operation continued unbalanced.

The hoist was built by the Lidgerwood Manufacturing Company, being equipped with double drums of 108 in. diameter and 52 in. face grooved for 1½-in. wire rope. Two post brakes are provided to hold in both directions. The brakes have wheels 54 in. in diameter with 12 in. face and are operated by compressed air.

Crusher Facilities

The skips dump on a headframe, 60 ft. above the ground level, into a 175-ton bin which has at its outlet a Mason squirrel-cage roll feeder and another step-

*Maryland Steel Company, Sparrow's Point, Md. Former manager, Pennsylvania Steel Company.

bar screen, all to pass 4-in. lumps. The oversize is crushed in two sets of 48x 48-in. corrugated rolls, with corrugated segmental faceplates. The first roll is set to 10 in., the second to 4 in., both being driven by a 250-h.p. motor. These rolls were built by the Morris County Machine and Iron Company, and are substantial and well designed.

The crushed product joins the under 4-in. size separated by the bar screen and squirrel cage mentioned above, and passes to two 15x5-ft. Allis-Chalmers revolving screens having 1¼ in. perforated plates. These two sizes, under and over 1¼ in., are stored in separate transfer pockets to be taken by the motor transfer car, over the steel viaduct, to the loading pockets where they are stored ready for railroad shipment.

OPEN PIT, INCLINES AND POWER HOUSE

Loading Pocket

The loading pocket is a concrete structure having a capacity of about 2500 tons of crushed ore; the shipping track passes under and through the bin arches, the cars being loaded by means of Mason rollers, not over two minutes being required for the loading of one car and several cars being loaded at once. Extending back from the bin is an elevated trestle 40 ft. high from which can be stored 30,000 to 35,000 tons of crushed ore; this can be reclaimed by a steam shovel or a grab-bucket crane operated from a railroad track.

Power Generation

The power for the operation of this plant will be generated at Lebanon by three 22x33-in. twin-tandem Westinghouse gas engines direct connected to 750-kw., 440-volt, three-phase alternators. These engines will operate on coke-oven gas which is to be piped from the ovens of the Lackawanna Iron and Steel Company and the Pennsylvania Steel Company, through an oxide sulphur purifier, a recording meter, and into a 250,000-cu.ft. gas holder from which it will be drawn as needed by the engines. The 440-volt current is passed through step-up transformers to a transmission voltage of 11,000 volts and is wired along the Cornwall and Cornwall & Lebanon Railroad tracks to the mines, entering the substation on the hill side where it is stepped down to 440 volts for use in the alternating-current motors. For use in direct-current work there is provided a 500-kw. rotary converter which will supply 500-volt direct current.

Features of the New Arrangements

The features of the new arrangements at the Cornwall mine which will make for more economic working are: (1) No ore is to be taken out of the mines with locomotives, thereby avoiding grade trackage and excessive repair costs. (2) The steam shovels can work to greater capacity, as no stops have to be made to break lumps. This also reduces powder costs. (3) Delays on account of shifting should be minimized, as all cars are 50-tons capacity and the operation is planned to be continuous. (4) The ore will be thoroughly mixed after passing the various machines and bins, including the storage bins. (5) The ore will be broken, ready for roasting. (6) The ore will be sized so that it can be mixed in the proper proportion for most efficient roasting. (7) Railroad cars will not be delayed in loading, and trips to the mines increased to one per car per day. (8) Railroad cars will not be damaged by mine handling. (9) The number of men required and possibly the time of operation will be lessened.

The present method of mining cannot be continued for more than 1,000,000 to 1,500,000 tons at any event owing to the excessive grades necessary, etc. By this scheme excess power can be sold to various consumers at a profit, as its cost at the switchboard should not exceed 5 to 6 mills per kw. hour.

The engineering work, in general plan and spirit, was layed out by A. J. Mason, of Hoover & Mason; the electrical apparatus furnished by the Westinghouse Electric and Manufacturing Company; the details, designing and construction, being accomplished by the company's engineers on the ground. The whole plant is expected to be in operation during the early fall.

Chrome Ore in Canada

By Phillips Thompson

According to a report just published by the Mines Department of Canada,[1] the production of chrome-iron ore appears likely to become an important Canadian industry judging by its rapid progress during the last few years. The statistical table published in this report shows that the output of chromite has increased from 1000 tons, valued at $20,000, in 1894, to 7225 tons, of the value of $82,008, in 1908. Up to 1902 production was unsteady, and the deposits were only superficially tested and operated. Their peculiar occurrence added so materially to the difficulties in mining and the cost of preparing the output for the market that there was no reasonable margin of profit. Different conditions now prevail; the deposits have, in many cases, been followed toward depth; more practical mining methods have been adopted, and concentration processes greatly improved.

Chrome-iron ore, or chromite, resembles in appearance magnetite, and in the beginning of the industry magnetite was frequently taken for chromite. The study of the deposits is closely connected with that of serpentine rocks, with which they are associated. Economically the most important serpentine belt in Canada is that extending from southern Vermont to Gaspé, in Quebec Province, the mineral constituents of which include chromite and asbestos. This great serpentine belt may be divided into three areas: (1) The area covering part of the townships of Bolton, Orford, Brompton, Melbourne

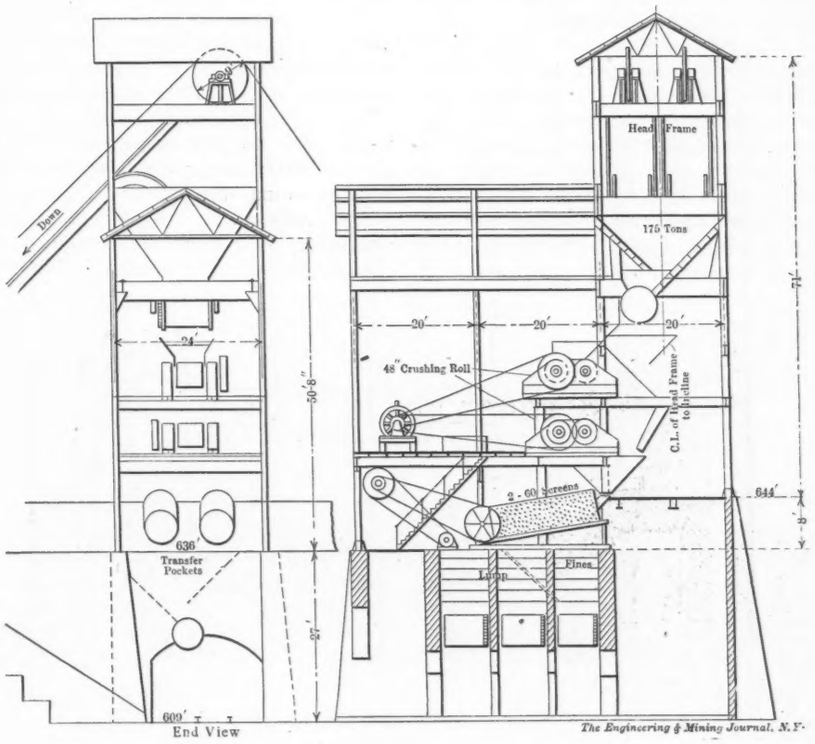
[1] "Report on the Chrome Iron Ore Deposits in the Eastern Townships, Province of Quebec." By Fritz Cirkel, Canadian Department of Mines, Mines branch. 1p. 141: illustrated, 10x6½ in.; paper. Otawa, 1909; Government printing bureau.

and Danville which may be termed the southwestern area. (2) The Thetford-Black Lake area covering part of the townships of Ham, Wolfeston, Coleraine, Thetford and Broughton. (3) The area covering part of the Gaspé peninsula. In the first area chromite exists at several points in Bolton, Brompton and Melbourne townships. Attempts at mining have been made, but in nearly every case the mineral was found in too small a quantity for commercial exploitation. As prospecting in this region is difficult owing to the heavy forest growth, its true value as regards chrome-iron ore can only be surmised. Similar conditions prevail in the Gaspé peninsula, where small pockets of chromite have been found in the serpentines of Mount Albert. All the productive mines of chrome ore are in the Thetford-Black Lake area, more especially in the township of Coleraine. The serpentines in this area form disconnected masses, generally of small extent in the great series of slates, schists and diorites designated as the Cambrian formation. Occasionally they assume such proportions as to form mountain ridges, as may be noticed in Black Lake, where the mines are situated on the great serpentine ridge, which attains a hight of 900 ft. Most of the serpentine in the chrome-iron-ore region contains a very small percentage of chromite disseminated through the mass in a fine state of diversion. The chromite does not occur in veins, but is found, as a rule, in irregular masses and pockets, having no definite form and no tendency to adhere to dimensions. These masses may have dimensions of from a few feet up to 50 or 75 ft. Cracks and faults can be found throughout and calculations as to the continuance of a deposit toward depth are entirely out of place. The mining of chromite will consequently always be attended with much uncertainty on account of the pockety nature of the deposit.

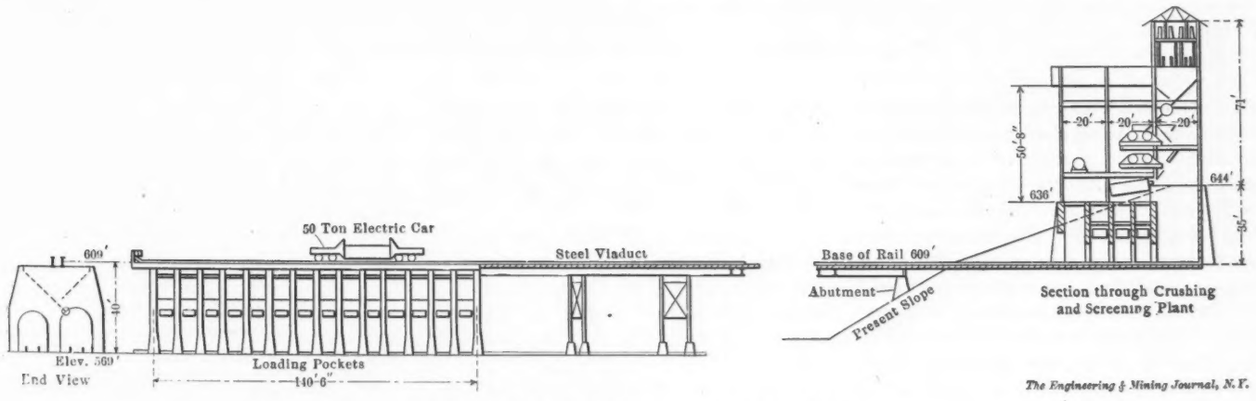
The serpentine is often cut by intrusive granite dikes, which are frequently in or close to chromite-iron deposits, and seem to have exerted a favorable influence on the deposition of the mineral. Sometimes these dikes cut off the work entirely, but in the majority of cases good ground is found by driving through the dike mass.

Owing to the irregularities of the chromite deposits there is considerable variation in the quality of the ore and rock mined. While one mine may deliver a high percentage of crude another may not produce any crude at all, but a milling material rich in chromite. In the one case the crude forms perhaps from 20 to as high as 40 per cent. of the total rock mined, while the bulk of the poorer rock goes to the mill. In cases where the crude deposits are not large and the disseminated ore predominates, from 5 to 10 per cent. of crude only may be obtained. The lowest percentage of milling rock of the total rock mined is 20 per cent. and the highest 65 per cent. On an average the chromite in the low-grade milling rock, as at present extracted may be taken as from 40 to 60 per cent. Rock containing less than 10 per cent. chromic oxide is usually allowed to go to waste.

The report gives elaborate details of the plant employed for the concentration of the ore and its preparation for market, and the present condition of the producing mines. Three companies are in the field, the Black Lake Chrome and Asbestos Company at Black Lake, the Canadian Chrome Company near Thetford, and the American Chrome Company operating in the neighborhood of Black Lake. There are in operation 75 stamps with a total approximate capacity of 150 tons of milling rock per day. About 150 men are employed during the summer season.



SECTION THROUGH CRUSHING AND SCREENING PLANT



ELEVATION OF TRANSFER AND LOADING SYSTEMS

A New Martin Furnace with Double Hearth*

The chief aims of modern steel works are output, economy and quality, and the attainment of the first two does not necessarily mean that the third will be satisfactory. The Thomas and Bessemer processes leave much to be desired in this respect, and the Martin furnace is coming to the front on this account. Talbot-Martin furnaces have been built to 250 tons capacity and larger ones will shortly follow. The economy of the Martin process is obtained by annexing the steel plant to the blast furnace, receiving the pig iron in a molten condition, and by the simultaneous smelting of ore.

When this process in stationary Martin furnaces is considered with the same one in tilting furnaces (Talbot process), it is seen that in the single-hearth stationary Martin furnace the rate of charging is limited on account of the excess of slag-forming materials, which are hard to remove from the stationary type, and which render the final refining difficult. If the highest rate of charging is sought in spite of the larger content of slag-forming materials, the loss of iron in the slag will be heavy. In the tilting furnace the heavier charge may be used, but a separate process is required for the final refining. With either process quality or quantity must suffer.

It was evident that a heavier charge could be used if the resultant slags, rich in iron, could be removed to permit the final refining and again worked over without loss of their iron and heat. This led to the invention of the Martin furnace with double hearth, and a tilting device whereby the slag could be poured from one hearth to the other. The furnace and process are protected by letters patent.

*Abstract of an article by Carl Brisker in *Stahl und Eisen*, July 28, 1909.

The furnace consists, as shown by the accompanying sketches, of a double hearth so constructed as to permit, by its mounting on rollers, a tilting motion which allows the contents of one hearth to run wholly, or in part, into the other. As opposed to the common form of tilting furnace, the tilting serves here not to discharge the furnace, but to carry on different operations simultaneously in the one furnace.

For iron smelting the furnace can be made with moving top, as the Mischer or Talbot type. This construction is shown in Fig. 4. The possible angle of incline here is slight as the walls of the hearths are not high enough to allow a greater tilt. Larger furnaces may be built with a parting in the roller-ways, as in Fig. 2, requiring a lighter supporting structure. There are no difficulties of construction to be overcome, only well known forms being required. The roller-ways do not rest directly upon the arches of the heat chambers, but upon the side walls outside the arches and upon a support in the center.

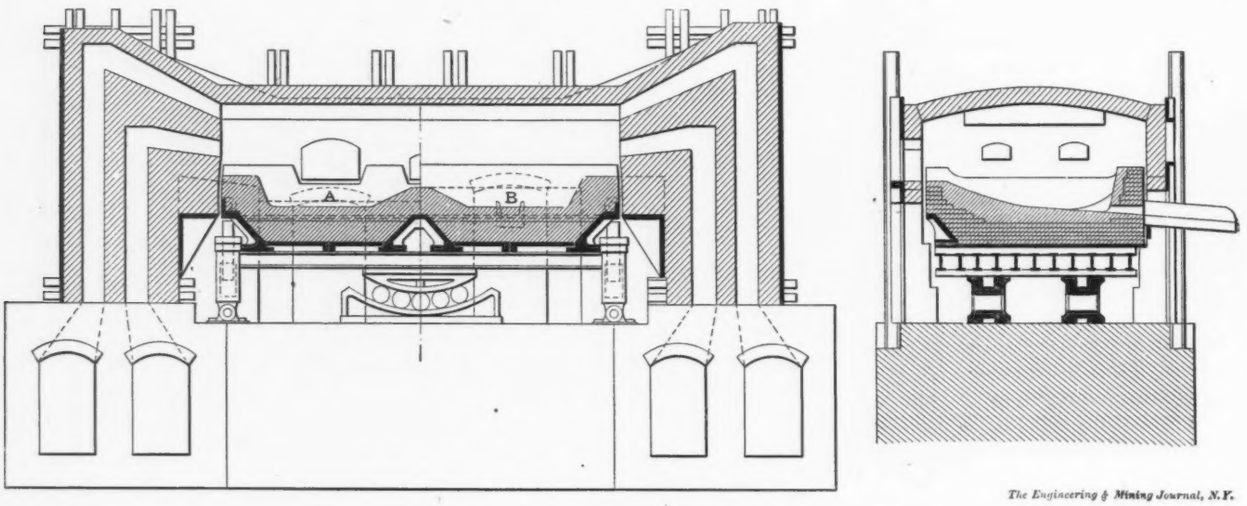
The amount of tilt given the hearths governs the amount of metal or slag to be run from one hearth to the other, this amount depending (see Fig. 3) upon the angle of tilt a, gradient of hearth b, length of hearth l and depth of bath t. To increase the amount of material flowing from one hearth to the other for a given value of a, the angle b must be decreased and the ratio $l:t$ increased. In the accompanying table, $b = 30$ deg. As the usual proportions of hearths seldom give $l:t$ less than 7, it is seen that a small value of a will allow considerable material to pass over.

In order to retain the charges when in a tilted position the outer walls of the hearths are raised, as shown. It is to be remembered that metal flowing over with the slag is not lost. Running the slag from the bath of metal is, as in electric furnaces, easily accomplished.

Another method of construction is shown in Fig. 1, in which the top and arches are stationary and the hearth alone movable. This construction is useful in metallurgical operations requiring low temperature.

Method of Operating

The method of operation in the combined pig iron and ore process, which first suggested the furnace, is as follows: A charge is left only sufficiently long in hearth A to reduce the iron from the slag, this being already decarbonized. In order to free the charge from the iron-bearing slag and to pave the way for the final refining, the furnace is tilted so the slag flows from hearth A to hearth B. After the slag has been poured into B, molten pig is charged, the contact of the pig and slag sets up an energetic refining action and the iron is taken from the slag. Meanwhile the charge on hearth A is finished and tapped. The hearth is repaired as usual and the tap hole left open.



The Engineering & Mining Journal, N.Y.

FIG. 1. DOUBLE-HEARTH MARTIN FURNACE WITH STATIONARY TOP

TABLE OF OVERFLOW FOR DIFFERENT VALUES OF $l:t$.

Angle of Tilting. Deg.	$l:t = 7$. Per Cent.	$l:t = 8$. Per Cent.	$l:t = 9$. Per Cent.	$l:t = 10$. Per Cent.
0	0	0	0	0
2½	16.5	18.0	19.0	20.0
5	32.5	37.0	41.0	45.0
7½	51.5	57.0	62.5	66.4
10	67.0	71.0	75.3	78.0
12½	77.0	80.1	82.6	84.5
15	83.6	85.6	87.7	89.0

As the operation is a continuous one, the slags, which have not been discharged, have become heavier. These slags must be poured when sufficiently low in iron. This is done after the charge has been tapped from A and the pig added to B. By a slight tilting of the furnace, the slag

runs from *B* to *A* and out through the still open tap hole. Or it may be discharged over the side walls of hearth *B* and the hearth *A* used at the same time for charging fresh material. In hearth *B* the heat generated by the decarbonization of the iron is made use of by the addition of iron ore. Ore is scattered over the charge as long as the temperature holds. As all of the iron cannot be reduced from the ore, a certain amount of ore is slagged. The desired slag, heavy with iron, is thus obtained. It will be later poured off into hearth *A* where the operation is steadily going on, molten pig added, and the process continued as before.

An advantage claimed over the Talbot double-hearth furnace is that in the Talbot furnace the slags must be withdrawn and taken to another furnace to save their iron content. As against the ordinary Martin process, the whole operation is complete in the one furnace. Phosphorus is completely extracted.

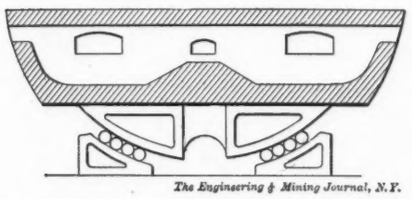


FIG. 2. HEAVY CONSTRUCTION WITH TWO ROLL WAYS

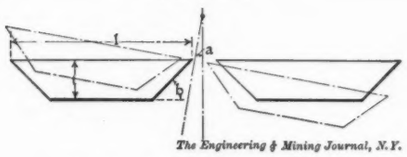


FIG. 3. DIAGRAM OF HEARTHS

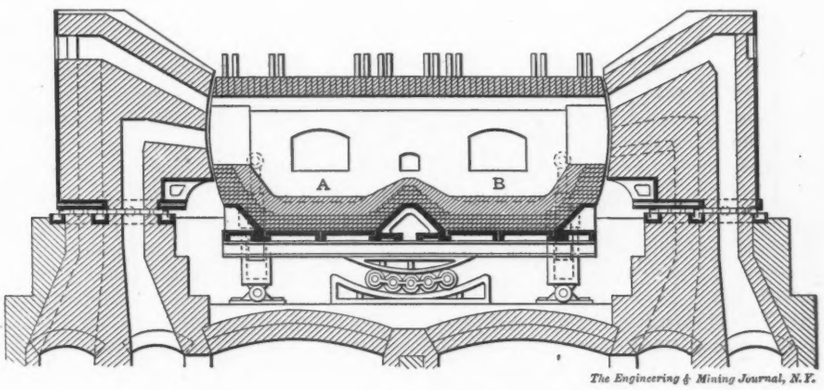


FIG. 4. DOUBLE-HEARTH MARTIN FURNACE WITH MOVING TOP

The Tungsten Ores of Canada

SPECIAL CORRESPONDENCE

A careful report on the occurrence of tungsten ores in Canada[1] has just been issued by the Mines Branch at Ottawa. The introductory part gives a general description of tungsten and its various uses, and the principal ores in which it is found, including wolframite, hübnerite, scheelite and tungstite, all of which occur in different Canadian localities, mainly in Nova Scotia and British Columbia. General chemical tests for the discovery of the presence of tungsten are given, with the indications which may guide the prospector in his work. Regions characterized by the occurrence of ores of tin or gold quartz veins occasionally bear tungsten minerals as well. While tin ores are of rare occurrence in Canada, in several of them tungsten is also found, as in Lunenburg county, N. S.; in the vicinity of Victoria mines, in the Sudbury district, and in some of the Yukon creeks, where cassiterite and scheelite are found in the heavy sand and gravel. It will accordingly be profitable to examine quartz veins in gold quartz districts. As a rule veins rich in gold are poor in tungsten, while near gold quartz mines, the veins may be valuable for tungsten but practically free from gold. An assay of concentrates from a stamp mill may reveal the presence of ores of tungsten. The dark color, easy cleavage and high density of hübnerite and wolframite, when found in quartz veins, are very characteristic. In placer mining the presence of scheelite is readily detected by the occurrence of rounded grains or pebbles almost white and so heavy as to concentrate with the gold. Though seldom thus found in quantities of economic importance, they may be a valuable indication of scheelite-bearing veins in the neighborhood.

Where intrusive granite comes in contact with slates and schists, quartz or pegmatite veins frequently intersect both the intrusive and the slate-schist series. It is generally agreed that the contraction of the granite mass occasioned fissures, which in the slate-schist series appear to have become quartz veins, at times carrying gold or tungsten. Where the slate or schist overlying the granite is not thick, these veins may occur at considerable distance from known outcrops of granite, while the latter may exist at no great distance below. Geological evidence suggests that tungsten deposits found in proximity to granite masses are derived from those constituents of the igneous mass which were expelled toward the close of the formative period, and found their way into pegmatite masses; irregular tin-wolfram-quartz veins carrying occasionally gold or tungsten or both. So far Canada has not become a producer.

The concluding portion of the work deals with the known occurrences of tungsten, the list having been considerably extended by the chemical examination of concentrates undertaken in connection with the investigation. In most instances the quantity of ore available is insignificant, and in others the grade is low, but these discoveries may be important as indicating the occurrence of larger or richer deposits in the vicinity. During the summer of 1908 scheelite deposits of a promising character were discovered at the Moose River gold mines in Halifax county, N. S., as one of the indirect results of the investigation. The attention of prospectors having been directed to tungsten a scheelite-bearing vein was discovered near the Waverly gold mine, Halifax county, about 40 miles distant from the Moose River deposits, and as it is in line with the strike of rocks the intervening region is regarded as an encouraging field for prospecting. Exploration pits had been put down on the Moose River scheelite claims to a depth of 25 ft. and a small quantity of ore produced, incidentally to development work. At New Ross, Lunenburg county, N. S., tungsten minerals occur in association with tin ore and several claims have been taken up, but are not being operated. Scheelite has for many years been known to occur in connection with silver in Marlow township, Beauce county, Quebec, but the mine never got past the prospecting stage. The discovery 50 years ago of wolframite in a boulder at Lake Couchiching, Ont., is believed to indicate the location of the parent deposit somewhere near the headwaters of the Ottawa. The tungsten ores of the Kootenay district in British Columbia occur in association with gold in quartz veins and are usually confined to well defined gold-quartz deposits. So far the tungsten has not been separated or turned to any commercial purpose, but it is hoped that the saving of tungsten ores may be found profitable in the case of some properties too low in gold to be worked as gold mines. Scheelite has been discovered in large quantities in the Cariboo district of British Columbia, masses of pure scheelite sometimes 50 lb. in weight, having been taken out, and the shipment of concentrates may be feasible.

[1] "Report on the Tungsten Ores of Canada." By T. L. Walker, Canadian department of Mines, Mines Branch. Pp. 56, illustrated; 9½x6½ in.; paper. Ottawa, 1909; C. H. Parmelee, King's printer.

The Carboniferous Deposits of Northern Coahuila

Geology of an Important Coalfield of the Cretaceous System. Abundant Fossils but Their Bad Condition Renders Identification Difficult

BY J. G. AGUILERA*

The first who made mention of the carboniferous deposits of Coahuila, their importance and quality, was Kuchler,[1] who considered the formation of these deposits as belonging to a coal system, and classified the limestone of the sierra as Blue Mountain limestone. He gives also a geographical description of the region, and mentions the existence and extent of the sheet of basalt, which is found there.

W. H. Adams[2] classifies as Triassic the coal in the vicinity of Cedral, northwest of Las Esperanzas, and at the foot of the Santa Rosa mountain, while he considers the coal of Eagle Pass to be Permian.

Persifor Frazer[3] also refers to vast coalfields discovered by Dr. H. B. Butcher, 66 miles northeast of Monclova and 20 miles north of Progreso, near the Sabinas river. He declares that the limestones of the mountains of this region are carboniferous and he ascribes to them an approximate total thickness of 6000 feet.

R. T. Hill[4] attributes to the last period of the Upper Cretaceous the great carboniferous formation of Sabinas which, he declares, is connected with the coal seams of the Rocky Mountain region, already worked in New Mexico, Colorado, Wyoming and Utah. In the geological map which he joins to his report he distinguishes: Coal measures (Laramie?), Lomita shales (Colorado) and Mountain limestone (Comanche), as subdivisions of the Cretaceous and Terrace conglomerate (Neocene) and volcanic lava (Post-tertiary).

R. T. Hill and T. W. Vaughan[5] give a table of all the formations of the plateau of the Rio Grande, in which they establish that the Edwards limestone subdivisions of the Fredericksburg division is equivalent to the Santa Rosa division of Hill.

The Lomita Shale schists, although lithologically resembling the strata of Fox Hills and Laramie, correspond to the Weberville and Eagle Pass subdivision of the Montana division; they are found in the mines of Eagle Pass, San Felipe and Sabinas, which lie to the north of Santa Rosa and to the south of the Sabinas river. The limestone conglomerate corresponds to the Uvalde formation (Pliocene).

C. A. White,[6] in treating of the northern region of Mexico, says: "Exposures of equivalent strata (Eagle Pass beds) occur in and near the valley of the Sabinas river, in the central part of the state of Coahuila, as well as at a few localities between the Sabinas river and the Rio Grande in the same state. * * * The Laramie, which is such an important formation in the two interior regions, is also an important one in the north Mexican region, especially in the states of Chihuahua, Coahuila and Nuevo Leon. Its presence in the first named state has already been mentioned, and it is also well developed in the Sabinas valley, in Coahuila, where it is an important coal-bearing formation."

T. W. Vaughan[7] asserts that the coals of Sabinas belong to the Fox Hills. He groups in four areas the carboniferous fields of the valley of the Rio Grande; in the third, he places the interior part of the plain of the Rio Grande, from the Santa Rosa mountains to beyond Eagle Pass. He mentions the coal mines of San Felipe, Fuente, Sabinas and Porfirio Díaz.

PHYSIOGRAPHY

The carboniferous district of Las Esperanzas forms a part of the coal-bearing region in the northern part of the state of Coahuila and small parts of northwestern Nuevo Leon and Tamaulipas. From an industrial viewpoint these sections form a single region in respect to the importance of the carboniferous basins encountered, especially in the state of Coahuila, although the coal of each of the states mentioned belongs to a different geologic age. The principal carboniferous fields that have been explored in this region, aside from Las Esperanzas, are: Fuente, Hondo, Mezquite, Agujita, San Juan, Sabinas, and El Menor.

This coal-bearing region belongs in part to the vast desert region of northern Mexico, and lies in the zone which borders on the Gulf coastal region. If we consider it geographically, it forms the southeastern extension of the most eastern ridges of the Rocky mountains, and of a portion of the plateau district which these ridges inclose. In general, it constitutes an immense plain, gently sloping toward the northeast and forming a bottom from which rise high mountains. These form part of the eastern Sierra Madre of Mexico and have an average strike north, 20-25 deg. west.

They divide the region into plains of different sizes, the surface of which here and there presents hills and little mesas of small altitude, while the upper part shows the remains of an ancient plain which latterly was cut up by erosion. The region that we have hitherto been considering forms the northeastern beginning, or the northeastern angle, of the great high plain which improperly has been called the Mesa Central Mexicana.

The relief of the lower parts is, then, comparatively monotonous, while that of the mountains is greatly diversified. One there encounters escarped and ragged ridges, presenting capricious outlines, narrow valleys passages and defiles characteristic of recent mountains. The region is cut by numerous streams of water, differing in class and importance, and all of which belong to the hydrographic basin of the Sabinas and Alamo rivers. By their confluence these two rivers form the Salado river, which is a tributary to the Rio Grande.

The land in the vicinity of Las Esperanzas, the scene of the Mexican Coal and Coke Company's operations, belongs to the lower portion of the region, and in the western part presents only slight undulations and small hills, the elevation increasing toward the sierra of Santa Rosa. Considered from a topographic viewpoint, the land of Las Esperanzas lies in the zone that forms a passage from the base of the sierra to the lower plain. Here as in many other places of the region the plain is subdivided by secondary elements of relief into various small topographic depressions, many of

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NOTE—The term "carboniferous" is employed in this article with its literal meaning of ground containing coal, whatever its geological age; for the Carboniferous system, the designation "Permo-Carbonic system" is used in accordance with the recommendation of the International Geological Congress.

NOTE—Translated from a paper presented in French before the International Geological Congress.

[1] Jacobo Kuchler, "Valles de Sabinas y Salinas." Exploration and description of the valleys of Sabinas and Salinas, etc.; 16 pp.; illustrated. Imprenta Imperial, Mexico, 1866.

[2] "Coals in Mexico, Santa Rosa District." *Trans.* A. I. M. E., Vol. X; pp. 270-273, 1882.

[3] "Certain Silver and Iron Mines in the States of Nuevo Leon and Coahuila, Mex." *Trans.* A. I. M. E., Vol. XII; pp. 537-569, 1883-84.

[4] "Report upon the Geology and Mineralogy of the Santa Rosa Mineral Zone, with Map." San Antonio, Tex., 1891.

[5] "Geology of the Edwards Plateau and Rio Grande." *Eighteenth Annual Report*, U. S. Geol. Surv., Part II, p. 243.

[6] "Correlation Papers—Cretaceous." *Bull.* No. 82, U. S. Geol. Surv., p. 138; Washington, 1891.

[7] "Reconnaissance in the Rio Grande Coalfields of Texas." *Bull.* No. 164, U. S. Geol. Surv., Washington, 1900.

which are bounded by anticlinal folds, very open and of slight elevation. These topographic depressions correspond to the synclinal folds, as at Las Esperanzas.

Geology

In all the carboniferous region of northern Coahuila, are found in great abundance two sorts of sedimentary rocks; there is also a volcanic rock occurring in extremely limited proportions. The sedimentary rocks are layers of marly sandstone, in color, light green, yellow and red; also, grayish limestones inclosing argillaceous schists, which are gray and black in the upper part and a more or less clear blue in the lower part of the formation. The sandstones are generally of fine grain; in certain places the schists are mixed with a little sand. There is a stratum, varying in thickness between 5 and 30 m., which is a conglomerate of large limestone pebbles.

As volcanic rock there is only the basalt which forms a covering over the limestone conglomerate. This basalt comes from eruptions in the sierra of Santa Rosa de Múzquiz. The liquid sheet flowed over an area of several hundred square kilometers, from its starting point to Sabinas and San Felipe.

This stream of basaltic lava served as a protective covering for all the ground over which it spread. Erosion first took place upon the land surrounding this stream, wearing it down to a low level, and then attacked the basaltic rock, with the result that the lava stream was first converted into a plateau, and by the erosion of later times, has been subdivided into a great number of small plateaus.

In the village of Sabinas, and in the vicinity of Agujita, the Neo-cretaceous series is represented by the Fox Hills sub-stage of the Montana; and further, in the vicinity of Hondo, by the Laramie sub-stage of the stage of the same name. All are covered with conglomerates of limestone pebbles which come from the limestone of the Meso-cretaceous series. This limestone reaches a thickness of 30 m.; at the base is a compact Pliocene limestone, which does not subdivide into regular layers; it is in turn covered by the flow of basalt, which is 2 m. thick, and reaches from the sierra of Santa Rosa to the right bank of the Sabinas river, and continues a distance of 45 km. to Hondo. In width it extends over a surface varying from 800 to 5000 m. if we connect the numerous mesas which today are separated by erosion, but which once, as we have seen, constituted a vast platform at the beginning of the Pleistocene.

The Laramie is characterized by two strata of schists and soft sandstone in well-defined beds, with different fossiliferous horizons, some of which, on the northeastern and southeastern boundaries of the carboniferous region contain the molluscan characteristic of Laramie, while the others inclose petrified tree trunks and impressions of plants corresponding to the upper part of the Fox Hills or to the lower part of the Laramie. This stage is found west of Lampazos, on the northeastern boundary of the Cretaceous coal-bearing region.

Montana Stage

The Montana stage, in its Fox Hills sub-stage, may be divided into three zones of an approximate thickness of 600 m.: The upper zone is composed of yellowish sandstone, marly and calcareous, with beds of gray and black schists, more or less carboniferous; the sandstones contain petrified tree trunks and impressions of Equisetum plants of indeterminable species. Over the sandstone, in the most elevated horizon of the zone, is found a stratum of Ostrea Cortex Conrad in the schists under the limestone conglomerate; in certain of the upper beds, the schists also bear impressions of indeterminable plants.

The middle zone is composed of gray sandstones with layers of coal intercalated. It is in this zone that borings of the Agujita have been executed, and where have been opened the mines of San Felipe and the new ones of Mezquite, near Sabinas, on the lands of the old hacienda de Soledad.

The lower zone is composed of bluish, argillaceous schists of considerable thickness. This zone is well represented south of the Sabinas river at Las Esperanzas; but it apparently does not exist at Agujita, Sabinas, Hondo nor Fuente.

At Las Esperanzas, the sedimentary rocks form two series of different petrographic character. The lower series is composed of bluish-gray, argillaceous schists. The upper series comprises calcareous and marly schists, with beds of yellowish limestones and calcareous sandstones, the latter also being yellowish and fossiliferous like the limestone. There are also calcareous sandstones of light-green tint, with intercalations of argillaceous schists. The sandstones contain impressions of plants and silicified trunks or stems, and are covered with sandstones and schists containing Ostreas. In certain places in the vicinity of Las Esperanzas, a cream-colored compact limestone comes above the sandstone with fossil plants, in discordant stratification; it is a limestone destitute of fossils. In no other part of the region with which we are concerned has this species of limestone been found. Upon the calcareous conglomerate, which covers the light-green sandstones, is spread a flow of basalt, about 5 m. thick in this basin.

SEDIMENTARY FORMATIONS OF THE COAL-BEARING REGION OF COAHUILA.

Group.	System.	Series.	Stage.	Sub-stage.	Division.	Plain.	Sierra of Santa Rosa.	
Cenozoic.	Tertiary.	Pliocene.			Uvalde Reynosa.	Calcareous conglomerate. Yellowish limestone.		
		Eocene.				Bench of oysters in the schists.	Destroyed by erosion.	
						Variegated schists.	Destroyed by erosion.	
Mesozoic	Cretaceous.	Neo-cretaceous.	Laramie.		Las Esperanzas.	Light greenish sandstones with silicified impressions of plants and stems.	Destroyed by erosion.	Danian.
			Montana.	Fox Hills and Eagle Pass. Fort Pierre.		Schists with workable strata of coal.	Only visible in slight thickness in some places at the foot of the sierra. Coal-bearing schists of small thickness.	Aturian.
						Fossiliferous, yellowish calcareous sandstones, with thin beds of schist and limestone, also fossiliferous.	Calcareous schist of *Exogyra costata* on the summit of the sierra. Fossiliferous schists of Múzquiz (Montana and Colorado).	
					Barroterán.	Bluish schists without fossils.		Emscherian (?).
			Colorado.	Niobrara Benton.	Peyotes.	Calcareous schists with *Inoceramus labiatus*, *Ptychodus Whipley*.		Lower Turonian.
		Meso-cretaceous.	Edwards limestone.			Santa Rosa.	Ashy-gray compact limestone.	Cenomanian.

In the sierra of Santa Rosa, the succession of sedimentary rocks is the same, with the exception of the lower bluish schists, which there are replaced by compact limestones of a grayish blue, upon which are the argillaceous and calcareous schists with Exogyra costata; in the foot hills are found the sandstones of Las Esperanzas. The coal which is mined at Las Esperanzas is found between the first and second divisions of the upper series.

Abundant Fossils

Fossils are abundant, but unfortunately the greater part of them are in very bad condition, so that some cannot be identified with certainty and others not at all. The fossils are almost always destitute of the shell, or partly so, and they are broken. Among the bivalves, the Arcopagia Texana Roemer is always found without the shell.

We meet these same sedimentary strata, but much richer in fossils, in the little mesas situated between the village of Santa Rosa de Múzquiz and the sierra of that name, of which the sedimentaries constitute the sides. The fauna is one of gasteropods characterized by Alaria sp. (?), and also by the presence of Ostreas of the group Ostrea glabra Meek (?). All the mollusks are destitute of their envelopes, and it is only after a detailed study of the ground that one will be able to obtain specimens permitting the establishment of complete identification; up to the present time, none has been discovered except individual specimens mutilated and without shell; among the latter Böse and I have found an example of the Nautilus, cfr. elegans Dekay, and some specimens of Ostrea Arizpensis Böse, which hitherto had not been encountered except in the upper Senonian of Ramos Arizpe, in the horizon of Sphenodiscus lenticularis (Owen). The discovery of this new locality is very recent and the study of its fauna that we are going to make will permit us to arrive at the precise determination of its age and of the subdivision into horizons which appears possible by reason of the variety of fauna that we have met in another place in the vicinity of Múzquiz.

Among the fossils of the Fox Hills sub-stage, forms are found which belong to the lower Fort Pierre sub-stage, and it is not possible to accurately separate these sub-divisions, as is the case in the western part of the United States. On the other hand, at Las Esperanzas there is not represented the upper stratum of Ostrea Çortex of the upper horizon, Eagle Pass division of the Fox Hills, and the Fort Pierre is not there developed; under the fossiliferous strata occur schists of great thickness, but without fossils. In consequence, we are unable to establish the equivalents of the American subdivisions and find ourselves obliged to establish provisionally the following subdivisions: Neo-cretaceous series for all the sedimentary deposits of the vast Cretaceous coal-bearing region of Coahuila, distinguishing in this series: The Barroterán division for the lower schists; the Las Esperanzas division for the fossiliferous strata of Las Esperanzas, Múzquiz and other places on the foothills of the mountain; the Sabinas division for the light-green sandstones of Sabinas village, ending in schists with a stratum of Ostrea Cortex; the Aroyo Tulillo division for the strata of Ostrea glabra Meek with Melanias, etc.; the Peyotes division, with strata of Inoceramus labiatus Schlotheim, etc. For the sake of convenience, the sedimentary formations of the carboniferous region of Coahuila are summarized in the accompanying table.

Tectonics

The majority of the mountains of this region are formed with a single anticlinal fold. They generally run in the direction north 20-25 deg. west, and some deviate to north 60 deg. west. In certain of them, the summit coincides with the anticlinal axis, and in others the axis of the anticlinal cuts the summit of the mountain at an angle of 40 or 50 deg., and in this case the strata forming the anticlinal are obliquely cut in the ravines, and depressions eaten by erosion. At some distance away, they resemble a succession of wrinkles on the side or slope of the mountain. The sierra of Santa Rosa presents an example of the first case and La Mitra mountain, near Monterey, an example of the second. All these mountains are monogenetic and are composed, in general, of a central body constituting the mountain, properly so called, and a series of hills and elevations on each of the sides that form the summit of the slopes separated from the central body by narrow and deep passages.

The sierra of Santa Rosa is a mountain, formed essentially by an anticlinal fold, composed, in the most elevated part of the mountain, of compact limestone, varying in color from clear gray to dark bluish gray and arranged in large benches. It belongs to the Meso-cretaceous series that Hill has named for this case the Santa Rosa division, and which, according to him, is equivalent to the Edwards Limestone division of the Texas Cretaceous. This limestone is covered with sandy and argillaceous deposits in thin layers of little strength, belonging to the Neo-cretaceous series and presenting intercalations of stronger limestone and sandstone strata These have been cut down by erosion on the crest of the mountain, and today form its foothills. Their sediments, uniform in inclination and almost equal on the two foothills, are separated from the body of the mountain by gorges and depressions, which end by forming little longitudinal valleys. At the foot, these sediments are less inclined and are joined to the plain, as already mentioned, by small anticlinal folds. On the sides of the central body of Santa Rosa mountain are seen some faults, almost parallel to the general direction of the mountain, running north 20 deg. west, with 25 deg. dip toward the southwest. The sizes of the faults are small and they have permitted movements which produced the present form of the mountain.

The plain is one of erosion, more properly speaking a plateau of erosion, which has developed into a tectonic plain, separated from the low grounds by a chain of mountains. It is partly covered by alluvial deposits.

The Coal Deposits

The formation of the deposits of coal is directly related to the orogenic movements which, folding the Middle Cretaceous and more ancient strata, brought about the formation of the Rocky mountains and their extension, the eastern Sierra Madre of Mexico, and also caused the formation of inland seas and lagoons, all along the zone of low land on the coast of the Gulf of Mexico. The depth of these seas and lagoons varied with the different movements which further and further accentuated the relief of the Rocky Mountains.

According to the conditions which there prevailed, they formed accumulations of lacustrine deposits with deposits of coal, or marine deposits devoid of coal. With the different conditions reigning alternately in the same general depression, there were produced sea-coast or deep-sea deposits, and deposits in inland lakes which intermittently communicated with the sea, and today, the deposits alternate in vertical series. The later orogenic movements have affected the coal-bearing formations which have undergone compression, slightly folding them in their entire bodies. This folding is particularly noticeable in the foothill of the sierra of Santa Rosa. It is fractured and shows faults in various places.

In consequence of these movements, the soil of this vast plain presents slight undulations which have subdivided it into several topographical basins of different dimensions. The sides are very open anticlinal folds hardly rising to an altitude of 50 m., which hight the majority of them do not reach. On the sides of these superficial basins the strata form a pronounced angle with the horizon, as is the case on the declivity of the sierra of Santa Rosa, where they have an inclination attaining 75 deg. But in the low parts, as well as in the hills and plateaus distant from the high mountains the slope ranges between two and five degrees.

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The British Mines Commission

SPECIAL CORRESPONDENCE

A voluminous report by the commissioners appointed in 1906 to inquire into certain questions relating to the health and safety of miners and the administration of the mines acts has recently been published. This is No. 2; the first report, which was issued in 1907, was mainly confined to discussing the subject of the use of breathing appliances.

The second report covers a much wider field and discusses generally the subject of accidents in mines and the means for their prevention as well as the health of miners. The report is divided into 22 parts, the titles of which show the scope of the inquiry. They are as follows: Part 1. Introduction. 2. Short sketches of mining legislation. 3. Inspection of coal mines. 4. Supervision and management. 5. Ventilation. 6. Accidents in coal mines—general observations. 7. Coal-dust explosions. 8. Shot firing. 9. Safety lamps. 10. Falls of roof and side. 11. Underground haulage accidents. 12. Shaft accidents. 13. Miscellaneous accidents. 14. Investigation of accidents. 15. The organization of ambulance and rescue work. 16. Special rules. 17. Ankylostomiasis. 18. Washing and drying accommodation. 19. Examinations for managers' and under-managers' certificates. 20. Preparation of plans. 21. Summary of main conclusions.

Attached to the report are nine appendices, chiefly statistical, but including also court decisions on the responsibility of owners and agents, and some notes on French methods.

The report has been compiled after a long inquiry, during which 134 witnesses were examined, of whom 57 were representatives of the workmen, 8 representatives of the National Association of Colliery Managers and 35 representatives of the owners.

Final opinions on all the matters referred to the commission are not expressed; the subject of watering or other means for dealing with coal dust, for instance, being left open pending further experimental work.

The main conclusions arrived at are summarized in the concluding part of the report and are classified under 88 headings. One of the more important recommendations relates to mine inspection, the commissioners being of opinion that the time has arrived for increasing the staff of government inspectors. An important innovation recommended is the appointment of a new type of assistants to the inspectors, with lower educational qualifications than the present inspectors. These men must have had thorough practical experience in work underground, should be over 30 years of age, and should pass a suitable competitive examination. On this point the commissioners were not of one mind, three of the commissioners being of opinion that it would be a mistake to add to the inspectors men of lower education, and that this action would be detrimental to the safe working of mines.

With regard to the examination of mines on behalf of workmen the commissioners as a body do not recommend the adoption of the system, employed in France, of inspection by "miners' delegates," paid by government, but some of the commissioners took an opposite view and considered the system an admirable one. It may be pointed out that, according to English law miners are entitled to employ two of their number to examine the mine at least once a month; but it appears that this provision is seldom taken advantage of, one of the chief reasons given being that it was difficult to find men to do the hard work for the pay given. One of the witnesses called thought that such inspections were unnecessary, and that the men in the pit were themselves always competent to make inspections; and that it was more to their interest to see that things were safe than to any outsider. On the subject of inspection by firemen the commissioners recommended that the position should only be open to those who had had five years' practical experience in a mine and had obtained a certificate as to his abilty to make accurate tests for firedamp. From the evidence given it appeared that many firemen had been appointed who were quite unfitted for this duty, important because such men had to a great extent in their hands the lives of the men under their charge during the whole working shift.

The report contains several recommendations in connection with securing improved ventilation and for minimizing the risk of accidents underground. The subject of coal dust is to be dealt with in a later report but recommendations are made for the prevention of its accumulation in the mines. The commissioners wanted to carry out some experiments of their own and asked the government for a sum of money which, however, was refused. Consequently they had to fall back on such information as they could obtain from private persons who are conducting experimental work.

One noticeable conclusion made in the report is that hoisting engineers should not be required to obtain a certificate of competency, but that they should be submitted to a periodical medical examination. Three of the commissioners considered that they should hold a certificate of competency and should not be employed more than eight hours. The commissioners as a body thought that the hours should be fixed according to the work done.

The commissioners were agreed that there was room for improvement in the matter of ambulance and rescue work but thought that the organization should at present be left to voluntary efforts. A point on which they differed was the provision of bath houses. Those in favor of compulsory bathhouses were also in favor of compulsury washing, a regulation which there might be some dicffiulty in enforcing.

It must be evident to anyone who reads the report that the commissioners have been at great pains to sift all questions relating to the health and safety of coal miners; and while no radical change in the present mining law is advocated there are a number of minor points brought out, which will probably lead to some useful and beneficial amendments.

Of the mining work performed on the Alaska Treadwell property during the year ended May 31, 1909, 9538 ft. was development; from stoping 830,551 tons ore and 1670 tons waste were obtained.

The Dust Problem in Coal Mines

By Joseph Virgin*

The dust problem still being a live question, I will here record my own experience and deductions in the use of sodium chloride and calcium chloride as collectors and retainers of moisture. Seeing that moisture in some form must be applied to the dust to render it harmless, I thought it advisable to experiment for myself, especially as a number of mining men object to the saturation of the air with moisture, for physical reasons. Other managers object to moisture in mine air because the water causes the bottom to heave and the tracks to get out of alinement. A final argument is that the moisture causes falls of roof.

Anything that will retain moisture and keep the dust in coal mines damp, is worth the consideration of coal-mine operators. Believing that calcium chloride would act satisfactorily, I determined to experiment. On Feb. 8, 1909, we placed 3 barrels (one-half ton) of common salt on about 500 ft. of heading, the latter being 8 ft. wide; we distributed the salt like sowing seed broadcast. The dust on the tracks was about 3 in. deep, and on the débris ⅛ in. All was covered with the salt.

We purposely left the dust on the tracks. In 24 hours the fine coal was moist, and in two days the dust was quite damp and would stick to the hand like wet gunpowder. The dust remained damp for more than a month. On April 8, 1909, this heading was cleaned up.

About this time, through the kindness of Mr. Clifton, manager of the Pomeroy Salt Association, Pomeroy, O., we received a ton of calcium chloride. This substance was delivered in 3 drums of about 7 cwt. each, and was heavy to handle. The chloride, which was in a solid lump, was pulverized to about the size of nut and slack mixed, and one-half ton was spread over the heading as was done with the common salt. The chloride began to collect water at once, and the next morning, 12 hours later, the water stood in small pools around the larger pieces; before the shift was over the dust was well mixed, and the road in places was a little muddy.

The warmer weather coming on, we have had no dust to clean up since, but have cleaned away about 100 tons of débris which fell from the roof and sides and from cars. The roadway, however, is still damp, which is due in part to the temperature and the saturation of the summer air.

Cost of Applying

The common salt was put on in one-half day by one man; the cost, therefore, was $1 for labor and $2 for one-half ton of salt, or a total expenditure of $3. Calcium chloride cost $7 a ton; it also cost $6 to pulverize and $1 to apply. The total cost in this case, therefore, was $7.

From these experiments it was concluded that sodium chloride was 50 per cent. as efficient as calcium chloride; the cost of sodium chloride was about 43 per cent. of that of calcium chloride.

This higher cost of calcium is largely on account of the necessity of pulverizing. Manufacturers of calcium chloride say you can crush by machinery; however, if we consider that a mine of 500 tons daily capacity would only use about 5 tons each winter, it is evident that it would hardly pay to erect a crusher. In a plant of, say, 5 mines with a total daily output of 3000 tons, there would not be necessity for the use of more than 50 tons in a season. This is also too small a requirement to make the erection of a crusher advisable.

The manufacturers also say that the salt should be liquefied and then pumped on with a spray pump from a water box. This cancels the factor of taking out the moisture in the mine atmosphere and is costly.

Conclusions

I therefore deduce these facts: 1. The salt (calcium chloride) will collect moisture faster than the salt (sodium chloride). 2. That calcium chloride retains moisture longer. 3. That in spite of these facts, common salt is cheaper. 4. The extra cost is caused by calcium chloride being in a solid. 5. A 700-lb. drum is unwieldy and difficult to handle in a mine. 6. Both salts should be sown on dry, not sprayed. 7. Common salt comes in small barrels and can be put on for $2 per ton. 8. Calcium chloride should be put up in 200-lb. packages that it may be easier handled. 9. Watering carts are a nuisance and a hindrance to the transportation of the coal in the day time and a costly method at night, without supervision. 10. Calcium chloride manufacturers should powder the salt so that it may be sown on any time. I believe a careful observance of these suggestions will make calcium chloride an ideal damper for coal dust, causing it to be efficient, clean, sanitary and cheap.

*Mine superintendent, Plymouth Coal Company, Plymouth, W. Va.

President Lewis Opposes Use of Black Powder

Thomas L. Lewis, president of the Mine Workers' National Organization, returned to his office in Indianapolis yesterday and issued a statement concerning the stand which he took at the recent controversy which involved 8000 miners of Pennsylvania. Mr. Lewis alleged that the officers of the Mine Workers in western Pennsylvania opposed the discontinuance of the use of black powder simply to satisfy a malice which they bear toward his administration. Mr. Lewis said he opposed those who favored the continued use of black powder and was instrumental in bringing about an investigation to determine whether its elimination will reduce the earning powers of the miners. "The mining department of the State of Pennsylvania has ordered the discontinuance of the use of black powder," said he, "and any blame for an explosion from this cause cannot be placed against the State. If an accident does occur it can justly be placed against those who insisted that it was not dangerous."

Concerning the trouble in the western Pennsylvania district and his services in bringing about a settlement, Mr. Lewis said: "For years there has been considerable agitation for the enactment of laws to provide greater safety appliances to protect the lives and health of the mineworkers. In recent years hundreds of lives have been sacrificed because of explosions in coal mines.

"Scientific experts employed by the Government have finally proved that dust, as well as gas, is responsible for the loss of life in coal mines. It has also been proved by investigation that the use of black powder or any other explosive causing a flame is more dangerous in gas-and-dust-accumulating mines than powder that produces practically no flame." Mr. Lewis said that the introduction and use of the new explosives have been a source of more or less friction in western Pennsylvania for several months and that he has endeavored to have an intelligent and thorough investigation in regard to the merits of the new explosives; the effect in protecting life and also on the earning power of the miners. The claim is made that the new explosive shatters the coal more than black powder does, and as they are paid on a screened-coal basis, it reduces their wages.

"The district officers of the mine workers in refusing to be a party to a joint investigation by the miners' and operators' representatives, and claiming that there is no such thing as a dust explosion, practically set up their judgment against the most expert and scientific mining men of the world."

Mr. Lewis said he would not be a party directly or indirectly, to opposing anything that means added protection to the lives of our people. He said he wanted an intelligent investigation of the whole subject in order that he may definitely determine whether the new explosives reduced the wages of the miners. He said there was no doubt in his mind but that the new explosives add to the safety of the men in those mines generating gas and accumulating dust. He said work in the mines had resumed pending an investigation of the question at issue by the or-

ganization; in the meantime black powder is being used.

Notes on Copper Smelting in the West

By Edward Dyer Peters*

In looking over the great copper-smelting works of Montana it is interesting to note the complete change that has occurred in the relative position of blast and reverberatory smelting furnaces. It is only a few years since we valued the reverberatory especially as a producer of a high-grade matte, knowing that, even though its sulphide charge might not be so well roasted as would be desired, yet the generally neutral atmosphere of the hearth and the consequent free hand for the beneficent reactions between sulphide and oxide, might be depended upon to remove some 20 or 25 per cent. of the sulphur still present, and thus aid the imperfect roast. The blast furnace, on the contrary, was looked upon merely as an apparatus for fusing. Its high coke charge gathered in both the fixed and the volatile oxygen pretty thoroughly, and any attempt to use even a small proportion of poorly roasted ore was followed promptly by a heavy flow of low-grade matte and a silicious slag, needing the prompt adding of limestone or iron oxides.

The Blast Furnace as an Oxidizer

These conditions have been changing rapidly for some time, and are particularly striking to a person like myself, who has not visited the district for some years. The situation at present is absolutely reversed; the neutral reverberatory is now regarded merely as a melter-down of roasted ore; and the 25 per cent. of sulphur that it removes from the charge during the fusing operation sinks into insignificance in comparison to the results obtained from its rival. The blast furnace is now beginning to take its true position as an oxidizing apparatus of extraordinary efficiency; and at Anaconda Great Falls, and Salt Lake City is run so as to remove 78 to 82 per cent. of the sulphur in the charge, and to produce a matte containing usually about 45 per cent. of copper. When one reflects that the ore charged into these furnaces consists only of raw sulphides; that less than 9 per cent. (calculated on weight of charge) of a very indifferent coke is used; and that two tons of air is blown into the furnace for each ton of ore smelted, it is plain that we are approaching the conditions of the pyrite furnace. It is curious to note the eagerness of the blast-furnace superintendent for raw sulphides with which to increase the calorific power of his charge. He is as eager now to secure them as we used to be the reverse, knowing they are to him both flux and fuel, and that, as their percentage increases, the coke bill diminishes correspondingly.

In this connection I may mention an interesting circumstance related to me by the metallurgist who had been conducting a series of experiments in this partial pyrite smelting at one of the great plants. He assured me that so long as his percentage of coke and percentage of sulphur on the charge added up to 18, it seemed to make little difference in the running of the furnace, whether he had 11 per cent. coke and 7 per cent. sulphur, or whether the figures were reversed, viz., 7 per cent. coke and 11 per cent. sulphur. He did not, of course, suppose that a pound of sulphur, with its accompanying iron, yielded as much heat as a pound of coke, but attributed the curious result in part to the increased fusibility of the slag that resulted from the extra iron belonging to the sulphur.

The Mathewson Blast Furnace

It is always interesting to see the largest specimen in the world of its kind, and Mathewson's 87-ft. blast furnace (with foundations already laid for a 40-ft extension) would well repay a long journey, were mere size its only distinctive feature. As a matter of fact, it has many claims to our consideration. For instance, it smelts an average of 2500—sometimes exceeding 3000—tons per day of charge. As its width is 56 in., it is averaging 6.15, and occasionally 8 tons per square foot of hearth area. It is singularly flexible, and permits of change of jackets, or of much more extensive repairs without shutting down the remainder of the furnace.

This feature was peculiarly emphasized a few months ago, when two English metallurgists, who were being shown over the plant by the superintendent, were evidently uncertain whether to accept seriously his statements that the furnace was not stopped when a water jacket was changed. Noting their somewhat ambiguous expression, the superintendent remarked that he was fortunate that day in being able to show them an exceptional instance of the kind, as some extensive repairs were being made at one end of the furnace, and it would be possible to descend to the bottom of the shaft. With some hesitation they accepted his invitation, and soon stood on the hearth of one part of the furnace, separated from the active portion by an irregular mass of partially chilled charge—hot, but not unbearable.

Furnace Refining at the Washoe Works

A peculiarly interesting feature in the furnace refining of copper was shown me at the Washoe smeltery. The electrolytic refining of the copper from this great plant is done on the Atlantic seaboard, but the converter copper is submitted to a partial refining at Anaconda, in order to produce a better anode plate for shipment. There are two refining furnaces in constant use, each casting about 300,000 lb. of anodes per 24 hours. As soon as one of these furnaces is emptied of its refined charge, it is used as a reservoir for the converter copper, which is poured into it direct from the ladles into which the converters are emptied. In about eight hours the furnace will have received its regular charge of 300,000 lb. of copper; the converter copper is then diverted to the other casting furnace, and the stage of refining begins. Although at Anaconda the refining operation is carried out only far enough to produce good malleable anodes (about 99.3 per cent. copper) yet the general sequence of events, as well as the behavior of the copper under treatment, is practically the same as in the more complete refining process, except that certain stages are shortened.

In the ordinary practice for making merchantable copper, the molten bath is skimmed clean and then subjected to powerful oxidation. Air is forced through it until several per cent. of the copper has been changed into cuprous oxide—this condition being accepted as a guarantee of a pretty thorough oxidation of the sulphur, iron and other foreign substances that are still present. The refiner takes a small test ladle of copper from the furnace every few minutes, and the completion of the oxidizing process (for this partial refining) is shown by the fact that the test button cools with a considerable depression in the middle of the surface, and with the formation of a triangular fissure at the bottom of this concavity. Oxidation having reached its maximum, the process of reduction now begins. By the operation of poling, the gases dissolved in the melted copper are driven out, and the newly formed oxide is reduced back to metallic copper.

An Anomalous Practice of Oxidizing and Reducing

At the Washoe works, it was noticed one day by the authorities that the furnacemen were poling the copper through one furnace door while they were blowing air into the bath through another. On remonstrating with the foreman for this anomalous practice of oxidizing and reducing at the same time, the superintendent was informed that an hour or more could be saved on each charge by using poles and air simultaneously, and that, without its aid, it would be hard to keep the furnace duty up to what was expected of it.

Investigation proving the proof of this claim, it has become the established practice at this smeltery. During my visit the superintendent was kind enough to have a test run made for me, under extreme conditions: namely, by oxidizing only

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long enough to remove most of the black specks (cuprous sulphide) from the test button, leaving the latter with an almost flat surface. Then, stopping the air altogether and beginning the poling, which operation in this case naturally divided itself into two stages: (a) stage of oxidation (?)—until test button showed deep depression with crack at bottom; (b) stage of reduction, in which the poling was continued until the crack and depression disappeared, the surface of the button became level, and the metal attained the required malleability.

All these phenomena occurred in their proper sequence and with great distinctiveness, furnishing what was to me a novel and interesting exhibition. I secured a series of nine test buttons representing the various stages of operation, and hope to derive some light from their examination.

The Smoke Question

The smoke question at Anaconda seems to be pretty thoroughly settled by the last decision of the court. The judge, after listening to expert testimony of the usual contradictory nature, examined personally a great deal of the property that was said to be suffering from the smelter fumes. This common sense procedure appears to have had a disastrous effect upon the complainants' case, and two trips that I took to ranches and stock farms within three to five miles of the smelter stack impressed me strongly with the justice of the late decision.

The succulent green leaves of root crops are pecularily sensitive to sulphur fumes and especially to the action of sulphates and arsenates; and while I failed to find any evidence of damage in the hay, grain, or clover crops, I certainly expected to see the yellowish patches, shriveled edges, and similar evidence of damaged leaves with which we are so familiar in the root crops. On looking over many rows of rutabagas and mangolds, I failed to find a single spot of the nature to which I have just alluded; and as all of these ranches are in the Deer Lodge valley, and in the direct path of the smelter fumes, I feel that the Washoe people have apparently accomplished two important results; namely, the approximately complete settling of the harmful sulphates and arsenates, and the discharge of the sulphur oxides at so great a hight that they never reach the ground in a sufficiently concentrated condition to do harm to either animal or vegetable life.

The report of the Carn Brea & Tincroft mines, Cornwall, England, according to the *Min. Journ.*, Aug. 21, 1909, shows that all hoisting has been accomplished, during the half year just completed, at a fuel cost of 3.54d. per ton.

Chronology of Mining for September, 1909

Sept. 5—Union Copper mine, Copperopolis, Cal., sold to Calaveras Copper Company by Ames estate, Boston.

Sept. 6—Hercules mill, Burke, Idaho, burned. Loss, $100,000. No insurance.

Sept. 8—Iron Mountain mine, Indian Springs, Cal., sold to United States Smelting, Refining and Mining Company.

Sept. 9—Announcement of closing of option on Butte-Ely property, Ely, Nevada, to Cole-Ryan interests.

Sept. 17—Old Dominion Copper Mining and Smelting Company awarded $2,029,000 in suit against A. S. Bigelow. Rehearing asked.

Sept. 24—Florence, Colo., smeltery sold at sheriff's sale.

Sept. 25—Announcement of purchase of Santa Gertrudis mine, Pachuca, by Camp Bird, Ltd., of London.

Sept. 27—Strike at Butte arising from internal dissension in the union settled and mines all resumed work.

Sept. 27—American Mining Congress convened at Goldfield, Nevada.

Sept. 28—Boston & Colorado Smelting Company announces liquidation and the dismantling of the Argo smeltery at Denver.

Sept. 29—Tintic smeltery, Utah, closed.

Development of Nitrate Deposits in California

Special Correspondence

W. J. Dingee and associates, of San Francisco, are about to exploit the niter deposits in Lone Willow district in the desert region of San Bernardino county, 15 miles southeast of Johannesburg, Kern county. Some 16,000 acres of land have been taken up on which more or less niter is found. It is planned to put up refining works to prepare the niter for the market. Nearly all the niter beds so far discovered in California are in the northern portion of San Bernardino county and extend into the southern part of Inyo county. They are found along the old shore lines, or old beaches, which mark the boundary of Death Valley. The beds and clays of the deposits which contain the nitrates have been worn by erosion into knobs, buttes and ridges having a soft rounded surface so they are easily identified.

There is a very large acreage covered by these deposits in the regions referred to and their existence has long been known. The depth is from 6 in. to 3 or 4 ft. Attempts have been made to interest capital in these nitrates so that they might be utilized, but some doubt always seems to exist as to the average per cent. of niter present. Therefore, there has, as yet, been no output of niter from California. The nitrate fields of California have been fully described by Gilbert E. Bailey in Bulletin No. 24, of the State Mining Bureau.

California Dividends

The California Oil and Stock Exchange of San Francisco, as reported in the *Chronicle*, Sept. 27, 1909, has posted the following list of dividends declared payable for September, 1909.

Company.	Dividend per Share.	Total.
Alma	$0.03	$11,000
Amalgamated	1.00	50,000
Brookshire	0.02	10,000
Columbia	0.00½	4,896
Caribou	0.25	20,175
Claremont	0.02	9,000
Esperanza	0.02	3,200
Euclid	0.01	3,500
Home	0.02	2,000
Illinois Crude	0.01	2,000
Kern	0.20	20,000
Lucile	0.10	2,670
Linda Vista	0.01	3,838
Monte Cristo	0.03	15,000
Palmer	0.02	36,040
Peerless	0.06	6,000
Record	0.05	5,000
Rice Ranch	0.01	3,000
Royalty	0.02	400
Sauer Dough	0.05	9,975
S. W. & B.	0.01	3,770
Sterling	0.25	62,500
Sesnon	0.15	15,000
Thirty-three	0.30	30,000
Wabash	0.01	3,000

Will Recover Coal Lost in Mississippi River

The Monongahela River Consolidated Coal and Coke Company lost from $600,000 to $700,000 as the result of a storm in the lower Mississippi valley. The loss in coal is estimated at more than 8,000,000 bushels. The company's manager, Mr. Theiss, stated that most of the coal will be recovered by digging, and water diggers, barges and boats are being rushed to the scene. Almost the entire supply of winter coal for New Orleans was lost. The company carries an insurance fund of its own and this money will be available to apply toward the expenses that will be incurred in the recovery of the coal.

"A business communication in Arabic reached a Manchester firm," says *The Marine Review*, "and when translated by a Syrian interpreter proved to contain a request for the price for 'two water sheep' of certain given dimensions. The translator was confident of his version, but admitted that he did not know what water sheep could be. For the moment even the principals of the firm to whom the communication was addressed were puzzled, until it struck someone that this was the nearest synonym in the vocabulary of a pastoral people for 'hydraulic rams.'"

September Dividends

In the accompanying table are shown the amount per share and total amount of the dividends paid during September, 1909, by a number of mining and industrial companies in the United States, Canada and South and Central America.

U. S. Mining Companies.	Location.	Amt. per Share.	Amt. Paid.
Bunker Hill & Sullivan, s.l.	Ida.	$0.15	$45,000
Calumet & Arizona, c.	Ariz.	1.00	200,000
Calumet & Hecla, c.	Mich.	8.00	800,000
Colorado, l.g.s.	Utah	0.08	80,000
Doctor Jack Pot, g.	Colo.	0.00½	15,000
Doe Run, l.	Mo.	1.50	98,623
Federal M. & S., pf.	Idaho	1.75	210,000
Golden Star Mines, g.	Ariz.	0.05	20,000
Great Northern iron ore properties.	U. S.	1.00	1,495,720
Homestake, g.	S.Dak.	0.50	109,200
North Butte, c.	Mont.	1.00	400,000
Old Dominion, c.	Ariz.	0.50	146,622
Old Dominion C. M. & S.	Ariz.	1.00	162,000
Iron Blosson, s.l.	Utah	0.08	79,200
Iron Silver	Colo.	0.10	50,000
North Star, g.	Cal.	0.40	100,000
Quincy, c.	Mich.	1.00	110,000
Phelps,Dodge & Co.,c	U. S.	0.02½	1,123,365
Round Mt. Mining,s.g.	Nev.	0.04	32,126
Sioux Con., s.l.g.	Utah	0.07	52,247
St. Joseph Lead.	Mo.	0.15	150,000
Utah Copper	Utah	0.50	366,837
Yukon Gold, g.	Alas.	0.10	350,000

U. S. Industrials.	Location.	Amt. per Share.	Amt. Paid.
Am. Smelters, pf. A.	U. S.	$1.50	$255,000
Am. Smelters, pf. B.	U. S.	1.25	375,000
Crucible Steel, pf.	Penn.	1.50	366,547
Gen. Chem., com.	U. S.	1.00	74,103
Inter'l Nickel, com.	N. Y.	1.50	123,339
National Lead, pf.	N. Y.	1.75	260,820
Standard Oil	U. S.	6.00	5,820,000
U. S. Steel Corp., com.	U. S.	0.75	3,812,268

Foreign Mining Companies.	Location.	Amt. per Share.	Amt. Paid.
Esperanza	Mex.	$0.37	$110,565
Kerr Lake	Ont.	0.30	180,000
Lucky Tiger Com., g.	Mex.	0.60	39,000
N. Y. & Hond. Ros.	C. A.	0.10	15,000
Peregrina M. & M., pf.	Mex.	3.50	35,000

American Mining Congress

The American Mining Congress in session in Nevada from Sept. 27 to Oct. 2, elected, through the directors, Dr. E. R. Buckley, of Missouri, president, to succeed J. H. Richards. Other officers were chosen as follows: John Dern, Utah, first vice-president; George E. W. Dorsey, Nebraska, second vice-president; Samuel A. Thayer, Pennsylvania, third vice-president; J. F. Calbreath, Jr., Colorado, secretary. The naming of the next meeting place was left to the new board.

The session was convened at Goldfield, and later visited Tonopah. Elaborate preparations for the congress were made by the Nevada committees, notably a fine mineral and ore display.

The program included many notable technical and practical papers. A resolution on the silver question brought out lively discussion. The forestry policy of the Government and the conservative idea was vigorously treated by the delegates. A report on the Alaskan mining laws was received with interest. Industrial accidents and insurance were subjects of consideration. The perennial mining-bureau question was up and the need of Government recognition of the industry was strongly urged. The session was well attended and successful in every way.

Mineral Production of California in 1908

The yield and value of the mineral substances of California for 1908, as per returns received at the California State Mining bureau from the producers, are shown in the accompanying table. For convenience the minerals other than precious metals are tabulated together. The precious metals will be reported separately. An increase of $10,503,048 in the production of substances other than precious metals is noted.

CALIFORNIA PRODUCTION FOR 1908.

Mineral.	Unit.		Value.
Asbestos	Ton	70	$ 6,100
Asphalt	Ton	105,443	1,082,376
Bituminous rock	Ton	30,718	109,818
Borax	Ton	22,200	117,000
Cement	Bbl.	1,629,615	2,359,692
Chrome	Ton	350	6,195
Clay (brick)	M.	332,872	2,506,495
Clay (pottery)	Ton	208,042	325,147
Coal	Ton	18,496	55,503
Copper	Lb.	40,868,772	5,350,777
Fullers' earth	Ton	50	1,000
Gems			208,950
Granite	Cu.Ft.	483,374	512,923
Gypsum	Ton	34,600	155,400
Infusorial earth	Ton	2,950	32,012
Lead	Lb.	1,124,483	46,663
Lime	Bbl.	396,386	379,243
Limestone	Ton	273,890	297,264
Macadam	Ton	2,939,901	2,446,768
Magnesite	Ton	10,582	80,822
Manganese	Ton	321	5,785
Marble	Cu.Ft.	18,653	47,665
Mineral paint	Ton	335	2,250
Mineral water	Gal.	2,789,715	560,507
Natural gas	M.Cu.Ft.	842,883	474,584
Paving blocks	M.	7,660	334,780
Petroleum	Bbl.	48,306,910	26,566,181
Pyrites	Ton	107,081	610,335
Quartz crystals	Lb.	4,000	10,000
Quicksilver	Flask	18,039	763,520
Rubble	Ton	1,059,044	795,006
Salt	Ton	121,764	281,469
Sand (glass)	Ton	9,255	22,045
Sandstone	Cu.Ft.	93,301	55,151
Slatt	Squares	6,000	50,000
Soda	Ton	9,600	14,400
Soapstone	Ton	3	48
Tungsten			37,750
Zinc			3,544
Total			$46,715,168

The larger items constituting the total increase for 1908, relate to petroleum, gold, macadam, bituminous rock and pottery clays. There was a large increase in the quantity of copper that was produced in 1908, as compared with the output of 1907, but owing to the low price for copper the value did not increase in 1908. The total value of the nonmetallic substances was $1,531,198. These substances include borax, coal, mineral waters, salt, infusorial earth, gypsum, magnesite, manganese, mineral paint, fullers' earth, soda, tourmaline, chrysoprase and other gems. The total value of the hydrocarbons and gases was $28,232,959, an increase of $10,203,022. The hydrocarbons and gases include asphalt, bituminous rock, natural gas and petroleum. The petroleum price is the average f.o.b. at wells or stations in each county. The number of barrels of oil produced was 48,306,910, valued at $26,566,181, as against 40,311,171, valued at $16,783,943 in 1907. The large production noted places California at the head of oil-producing States, with Oklahoma second. The increase in asphalt production is large for the year. The total value of structural materials in 1908 was $10,132,179, a decrease from 1907. The value of the outputs of the principal minerals of the State are for 1908, in the following order: Petroleum, gold, copper, clays and their products, macadam, cement, asphalt.

The British Oil Trade

The London *Economist* of Sept. 25 says: "Some three months ago the working agreement between the three large petroleum companies—the Anglo-American, the Home Light, and the British Petroleum—came to an end, and the price of petroleum (lamp oil) was dropped ½d per gal. in our markets. This was erroneously supposed to be in the nature of an attack on the Scotch paraffin oil companies, but the cause of disagreement was the result of the effort of the Anglo-American to capture the retail trade by offering special bonuses to all the dealers who would engage to take all their requirements from this company for a term of years. This process did not work out, but when the time came for the Scotch companies to make their contracts for burning oil for the new season, which begins in September, they had to fix the price at ½d per gal. less than last year. On the reduced basis the usual contracts have been made, and, we understand, for a larger quantity than last year. The Scotch wholesale dealers have refused, we understand, to have anything to do with the contract system proposed by the American company, which involved the disclosure of names and addresses of their buyers to the sellers, and, in fact, handed over the whole details of the retail business to the representatives of the Standard Oil Company. The American company has, on the other hand, found it advisable not to push the sale of petroleum in Scotland, as it began to do last year, by road tank wagons, because whatever paraffin oil was in this way displaced in Scotland was simply put up in competition against it elsewhere. Thus, as a matter of fact, the Scotch market is being now left both by American and Russian sellers to the Scotch makers, but the price of petroleum has been kept down by the incidence of the competition of the Galician petroleum, which the Standard company has tried to corner on the Continent. It is presumed that some agreement has now been come to, as it is stated that the price of petroleum is about to be raised ½d. per gal. again."

Colliery Notes

Mine dust and well-ground cinder ashes are good material for use in mixing and preparing masonry and brickwork mortars.

At some of the mines in Russia where operations are far distant from railroads, the average contract price for hauling coal as let to natives is $3.72 per ton per 100 miles.

A unique discovery of vanadium in appreciable quantity is said to have been made recently in one of the coal deposits near Rockwood, Penn. Details of the new discovery are being closely guarded.

Roman cement makes a better paste for pipe-jointing and outside pointing than portland cement; not because it sets harder, but because it is more adhesive, and, therefore, less is wasted in the work.

Finely ground cement goes farther and sets better than coarsely ground, and is far superior for making hydraulic concrete. The weight per cubic foot of cement should always be specified in asking for bids, otherwise the quotations may be misleading.

Referring to hydraulic mortars in general, no more should be mixed than is required for immediate use, as its primary strength cannot be recovered on mixing a second time. Although it will harden, it is short, and disintegrates sooner than when mixed once only.

For ascertaining the setting time of cement, a "needle" has been designed. This device weighs 2½ lb., and the point has a flat end exactly 1/16 in. square. The cement is considered to be set when the needle fails to make an impression on applying its point gently to the surface.

While cement concrete is denser, and able to resist higher compressive strains, it is not more impervious than lime concrete, although the cost is much less. Lime in the proportion of 4 to 1 makes a good fat concrete, and, if carefully mixed, it is impervious to any reasonable head of water.

It is a fact that in a coal mine, if the surface of the coal is wet, the force of an explosion will be retarded temporarily. However, the temperature of an explosion is so high that in spite of the high specific heat of water, if the oxygen supply is continued, the moisture clinging to the surface of the coal will be quickly vaporized, and the coal will begin immediately to volatilize.

When the air current in a mine is kept in a continuous state of saturation by means of fine sprays, through which the water is discharged in the form of invisible mist, the common practice in Europe is to have the sprays about 300 ft. apart; the quantity discharged from each spray should be regulated, so that the atmosphere at that point is just saturated; any quantity of moisture greater than what is required to saturate the current increases the danger due to the presence of water.

At the coal mines in Western Siberia the working hours are from 6 a.m. to 5 p.m. The earnings of the men employed at the coal-face vary from 54c. per day for Kirgheese to 80c. per day for Russians. The average output per person employed at the coal-face is about one ton per shift. Skilled labor on the surface is paid 70c. per day, while nonskilled labor is paid from 25 to 50c. per day.

The small amount of nitrogen that is present in coal is extremely useful as a by-product. During the process of coking, the nitrogen combines with hydrogen to form ammonia, NH_3. The ammonia is given off from the coal as a gas and is converted into a solid form as sulphate of ammonia, by passing through sulphuric acid. This product is then used for ammonia salts and for artificial manure.

Properly slaked lime will keep for centuries, and improve with age, especially if kept covered with water. The Romans had a good municipal rule bearing upon this subject. They made it compulsory on every builder that no lime should be used in any building unless it had been slaked at least three years. Observance by the Romans of such rules, therefore, accounts for their excellent walls, which were fit to receive and retain any color of paint placed upon them. There are particles in all limes which require longer to slack than others.

Where steam saturation of the intake air is the plan used to moisten dust in a coal mine, it should be remembered that if the temperature in a saturated current exceeds 90 deg. F., the result will be dangerous to life; for safe working, the temperature in a saturated current should not exceed 75 deg. F. The quantity of moisture carried by saturated currents of 100,000 cu.ft. per min., at 75 deg. F., is about 13½ gal. of water. In saturating the intake current of air, the steam should be discharged into the air through several pipes situated at different hights in the shaft.

The output of the beehive oven may be estimated at approximately 10 tons per oven per week, or a yield that is about 15 to 20 per cent. less than is obtained in the retort oven. Because the coke produced in a beehive oven has a more silvery luster than the coke where extraction of by-products has been carried out, it has been commonly believed that the beehive coke is far superior. There is, however, less ground for this belief than is generally acknowledged. Retort-oven coke is not generally inferior in quality to the beehive product, while as regards mechanical strength, the former is superior to the other.

In the many so-called dust explosions, there is no doubt but that the solid coal itself has played an important part in the final explosion. All experiments so far have proved that small particles of coal, under favorable circumstances, may cause a disastrous explosion; however, the results of such experiments do not prove that while a small particle of coal is explosive, another piece of coal a size larger is not explosive. It is, therefore, necessary to believe that one of the most important points to consider in an underground explosion is the area of the free surface of coal and its disposition to yield up its volatile constituents in the vicinity of the explosion. There is no doubt but that in many dust explosions when sufficient oxygen was present, the temperature of the explosion was sufficiently high to volatilize the solid coal and regenerate the explosion.

Although the closed, or retort, type of coke oven is becoming more and more common in Germany, the open or beehive oven is still used in many places. German engineers, basing their statements on long experience, assert that the proper size for a beehive oven is 11 ft. diameter by 7 ft. high; the sides and roof sloping inward gradually to meet as the oven is built up. It is further stated that the floor should have a fall of 12 in. from back to front to facilitate the withdrawing of the charge and to permit free drainage of the water used in cooling it. The oven door should be about 4x3 ft.; if the door is larger, there is opportunity for air leakage, while if the door is built smaller it becomes a difficult matter to withdraw the charge. German engineers also prefer to use the same fireclay for setting and for plastering outside, as the oven bricks were made of; the reason for this practice being that the expansion and contraction will be thus equalized.

A unique air receiver has been built at an eastern colliery. The receiver consists of a disused underground gallery, 400 ft. long and 9 ft. high by 6 ft. wide, with a capacity of 22,000 cu.ft. The tunnel was driven through solid rock which contained no seams or cracks. A 10-ft. concrete bulkhead was built at either end. A 6-in. pipe was led into one of these walls, and a manhole provided. Air was pumped in until the pressure reached 100 lb. per sq.in. The two compressors which charged this reservoir have a combined capacity of 7500 cu.ft. of air per min., and can pump the receiver up to full pressure in 23 min. The advantage of having such a large receiver is that it exerts an averaging influence on the demand for air from the compressors. A group of drills can be started or stopped without greatly influencing the air pressure, and the compressors work at a more even load than would otherwise be the case; also the regulating devices do not act so frequently, which results in less wear on the machines.

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Illustrated.

A Chance to Get Rich Quick?

In the constellation of the porphyry coppers, where the unit of idea is about ten millions and a paltry million tons of ore is of no particular account, it is alleged that through some telescopes a new star of the first magnitude has been discerned. It may be marveled that the existence of an orebody of upward of 30,000,000 tons should have been heretofore overlooked, but even so through centuries of science was missed the presence of a new element in the very air we breathe.

In the days agone—four years or so—when the Ely boom was swelling and promoters were waxing fat, the speculatively inclined were wont to scan the map and putting their metaphorical finger upon the property of the Ely Central, lying lusciously between the Ruth and Eureka "estates" (this term is becoming fashionable in promoting literature) of the Nevada Consolidated, reasoned that their orebodies probably extended into it, if not right through it, and *there* obviously was the great chance to be in on the development of a new mine. It was overlooked that this property so attractive geographically was not so seductive geologically, its surface being not the ore-bearing monzonite of the district but rather an overflow of rhyolite; and that Bradley and Requa, who conducted their early operations with great skill and the aid of expert geological advice, acquired the best of the monzonite area and evidently did not deem it worth while to connect their Ruth and Eureka groups. The intervening property being later acquired by the Ely Central Copper Company, some drilling and desultory prospecting was done without finding any ore of consequence and then operations were suspended. But enough of history.

Ely Central has lately been talked of stentoriously by some persons interested and has filled the columns of some public prints. In one week the stock rose from 87c. to $1 1/16. We have been assured that one-half of the effort exerted by the bull pools in some other stocks would easily have put E. C. to $2. "It is not, however, the purpose of these inside interests in Ely Central to manipulate or stimulate the market. They are content with the recent market course of the stock as they prefer that the distribution of it to the public shall be accomplished at a figure which does not discount the probable future value of the mine." The reason for this liberal policy is that "it is much fairer dealing with the public." However, it is considered probable that E. C. will go to $5 within a few months. So here ought to be a chance to get rick quick, if hopes are realized.

The hopes have been supported by a report by Col. W. A. Farish, which has been characterized as "deliriously favorable." Col. Farish measures the distance between the Ruth and Eureka (of the Nevada Consolidated) as 1800 ft. Although there has been no development upon the E. C. between those properties, he says, there is but little risk (in his opinion) in assuming that the ore deposit goes right through. The width of this deposit being 1200 ft. and its thickness 200 ft., as shown by the Nevada Consolidated, the probable reserves of the Ely Central are a simple matter of arithmetic. Anyone can figure them out to be about 33,000,000 tons—or 33,230,769 to be precise. Clearly this is the most rapid development of ore that is on record.

Inasmuch as the above-mentioned ore has not yet been actually seen it is perhaps premature to talk about the grade, cost of mining, extraction in milling, etc. Probably those factors will be about the same as for Nevada Consolidated, so what's the use of wasting thought about them. Anyway, it is expected that copper can be produced at 6 to 8c. per lb. and some may be as cheap as 5 cents.

Assuming that the monzonite goes under the rhyolite of the Ely Central without confusion by faults, dikes, or other geological perversities, and assuming the monzonite to be cupriferous, we should really like to know if the secondary enrichment with chalcocite, which conferred so much value upon the Ruth and Eureka monzonites, occurred in the intervening property before the rhyolite flowed over it, or after; but doubtless we shall have to wait for time to tell this. In the meanwhile we are of the opinion that Ely Central as a speculation is a little too strong for women, children and clergymen.

The Gayley Dry-air Blast

The Gayley dry-air blast process continues to make substantial progress, although circumstances have not been especially favorable to the introduction of improvements. There are now seven air-drying plants in use in the United States,

having a total capacity for handling 400,000 cu.ft. of air per minute, while negotiations are pending for the installation of other plants having a capacity of 1,000,000 cu.ft. per minute. Abroad a plant able to dry 70,000 cu.ft. per minute has been for some time in operation in South Wales; while in Germany, where the process was bitterly attacked and its usefulness questioned by several prominent writers, a plant of considerable size is being installed by a large iron company.

The South Wales plant above referred to is at the blast furnaces of Guest, Keen & Nettlefolds, Ltd., at Cardiff, and some details of the results obtained from it have recently been published in the London *Iron and Coal Trades Review*. These were not obtained in any experimental runs, but in actual practical working over a series of weeks. They are of much interest, as showing the operation of the process under local and climatic conditions entirely different from those for which it was originally designed and used. In the following table, compiled from careful observations extending over many weeks, the respective columns show: (1) the results obtained with natural air; (2) the results obtained with dry air, the furnace being driven for increase in output mainly; and (3) the results when attention was directed to economy in fuel consumption:

	1.	2.	3
Weekly product, tons of pig iron	2,001	2,530	2,286
Coke used per ton of iron, lb	2,278	1,972	1,857
Per cent. of increase in output	.....	26.4	14.1
Per cent. of decrease in coke used	.....	13.4	18.4

These results seem to be entirely satisfactory, both as regards the increased production of iron and the saving in coke. It is interesting further to note that, notwithstanding the different conditions of climate and working, they differ little from those obtained by Mr. Gayley in his trial at Isabella furnace in Pittsburg, as stated by him in his original papers for the American Institute. The following table compares the figures obtained in operation at the two plants:

	Isabella.		Cardiff.	
	Nat. Air.	Dry Air.	Nat. Air.	Dry Air.
Iron produced per week, tons	2,800	3,024	2,001	2,286
Coke used per ton, lb.	2,278	1,821	2,278	1,857
Increase in output, tons	.....	224	.....	285
Increase in output, per cent	.....	8.0	.....	14.1
Decrease in coke, lb.	.....	457	.....	421
Decrease in coke, per cent	.....	20.0	.....	18.4

Cardiff furnace showed a slightly lower rate of decrease in fuel consumption, but a greater proportion of increase in output.

These figures give a basis of computation from which it is possible to calculate whether the saving effected will compensate for the first cost of the drying plant. It is certain that it is very much greater than the cost of operating that plant. The saving in fuel has been abundantly proved, while the increased output is so large that in a great steel plant there can be a substantial decrease in the capital invested in blast furnaces, which is a most important item. Without going into details of calculation, we think that the figures given above will be sufficient to show that the savings effected are more than sufficient to pay interest and depreciation charges on the drying plant, besides all working costs. In support of this we have the testimony of Mr. Cook, in his careful paper on the process as used at Warwick furnace. The results at Warwick—a merchant furnace running on foundry iron—also included a greater uniformity in quality of the product.

The dry-blast process has now been tried under differing conditions of climate and temperature with unvarying success. It has evidently come to stay, and there is little doubt that its use will increase more and more rapidly as its advantages are appreciated.

The Broken Hill Proprietary Mine

The latest report of the Broken Hill Proprietary Company, shows rather a decadent condition at this mine, one of the great silver-lead mines of the world. In the half-year ended with May, which is covered by the report, the production was only 7609 tons of lead and 438,109 oz. silver, that of the preceding half-year having been 47,842 tons of lead and 2,926,148 oz. silver. In large part this great decrease was due to the strike of the laborers, to which reference has heretofore been made in our columns. The strike has ended, the men finally accepting the decision of the Arbitration Court, confirmed on appeal by the High Court of New South Wales; but the company has kept the greater part of the mine closed for the reason that operations do not pay under the established scale of wages and at the present prices of metals. This decision was rather helped by the fact that the mine is, apparently, past its most productive days, and no new ore reserves have been developed. The difference in the extent of the workings is shown by the statement that before the strike 4427 men were employed, while in May there were only 1804 on the payrolls. The smelting and other operations have been curtailed to a corresponding degree. These are extensive normally, for the Proprietary company is a great industrial concern, turning out, besides lead and silver, large quantities of zinc concentrates, sulphuric acid and other by-products; mining its own coal and making the coke for its smelting works.

An interesting table appended to the report gives the prices of lead and silver over a series of 25 years. During that period the highest price obtained for lead was £21 per ton in 1907; the lowest, £9 in 1894. The highest in the last half-year was £13 15s., and the lowest £13. Silver ranged from 50d. per oz. in 1885 to 21 11/16d. in 1902; this year going nearly as low, to 22d., while the highest point reached was 24⅝d. early in the half-year.

The JOURNAL is by no means a medical paper, or anything but a paper that deals with engineering and mining. Nevertheless we have thought it useful to present in this issue the excellent article on "Tropical Malaria" by Dr. Chester and Mr. Semple. This disease is unfortunately one that is suffered by many engineers who go to the tropics, and references to it have been common in the technical contributions of Mr. Garrison, Mr. Sharpless, Mr. Hutchins and many other engineers. We think, therefore, that the present contribution will be useful to many of our readers who are called to the tropics. Mr. Semple, one of the authors of this paper, is a mining engineer, but he has made a special study of malaria and has been in communication with the medical staff on the Isthmus of Panama and with medical men in Italy, South Africa and China, who have given him suggestions as to the prevention and treatment of this complaint, which is so prevalent in the tropical lowlands. Dr. Chester was for a long time on the staff of the medical department of the Nicaragua Canal Company at Greytown where he had ample opportunity to study many forms of malaria, besides which he has had much experience in the Hawaiian islands and other malarial districts.

The American Institute of Mining Engineers

SPECIAL CORRESPONDENCE

The 97th meeting of the Institute was held in Spokane, Wash., Sept. 27-29. It was preceded and followed by an extended trip, a special train being provided which carried members from points in the East and the Central West. In all 65 members and guests joined in this excursion, many of the guests being ladies.

The special train arrived at Butte, Mont., Sept. 24, the day being spent in visiting mines and mills, with a reception at the Silver Bow Club in the evening. Leaving at night the train reached Anaconda Sept. 25, and that day was spent in the same way as at Butte.

Leaving Anaconda at 6 p.m., Sept. 25, the train proceeded by the Missoula cut-off to the Cœur d'Alene district, the trip over the summit being made by daylight. Upon arrival at the Morning mine, a Federal Mining and Smelting Company property, near the town of Mullan, a stop was made there to inspect the mine and mill, after which the train proceeded to Wallace, arriving about noon, Sept. 26. In the afternoon side trips were made up Cañon creek with visits to the Hecla and Hercules mines.

Monday morning, Sept. 27, the train dropped down to Wardner, where the party inspected the Bunker Hill & Sullivan mine and mills. In the afternoon the journey was resumed to Harrison, where the party left the train and proceeded by steamer to Cœur d'Alene, at which point they again took the train for Spokane, stopping at Post Falls to view the new power plant of the Washington Water Power Company.

THE MEETING

The train arrived at Spokane Sept. 27. The first session of the meeting was held Sept. 28 in the assembly hall of the Masonic Temple. E. J. Roberts, chairman of the local committee, opened the meeting and introduced J. C. Ralston, city engineer, representing the mayor. Mr. Ralston made an address, cordially welcoming the visitors, and appropriate response was made by Dr. R. W. Raymond.

Dr. D. W. Brunton's paper on "Progress in Mining and Metallurgy" was then read, and called out an extended discussion, the speakers being William Kent, Charles Catlett, Dr. W. O. Snelling, E. S. Hutchinson, Charles Goodale, Ernest Levy, W. L. Saunders and William Kiddie.

At the second session, on the evening of Sept. 28, D. W. Brunton's paper on "Ore Sampling" was read, and was discussed at length by William Kiddie. The paper by F. Bache on "Dust Explosions" was read in abstract by Doctor Raymond and briefly discussed.

The third session, on the morning of Sept. 29, was a joint meeting with the Western branch of the Canadian Mining Institute. McD. Porter's paper on the "Hydraulic Elevator" was first read and discussed by William Kent and Doctor Raymond.

A number of the members of the Canadian Institute were present, and two papers were presented: "Notes on the Coal Resources of Southeast British Columbia and Alberta," by E. Jacobs, Victoria, B. C., and "The Galt Coalfields of Alberta," by W. D. L. Hardie, Lethbridge, Alberta. After the reading and discussion of these papers the meeting adjourned.

The rest of the day was spent in visiting points of interest about Spokane. On the following morning, Sept. 30, the train left that city.

The meeting was followed by an extended excursion, the stopping points being as follows: Seattle, Wash., Oct. 1-3 inclusive; Tacoma, Wash., Oct. 4; Portland, Ore., Oct. 5; Salt Lake City, Utah, Oct. 7-9, including visits to the Tintic mining district, Bingham and the Garfield smelting works; Glenwood Springs, Colo., Oct. 10; Pueblo, Colo., Oct. 11. At each place visited the members and guests were taken in charge by a local committee. The chairman of this committee at Seattle was Chester F. Lee; at Salt Lake City, Duncan McVichie; at Pueblo, J. B. McKennan.

The papers presented at this meeting, most of which were read by title only, were as follows:

1. "Dust Explosions in Coal Mines." By F. Bache, Fort Worth, Ark.
2. "The Formation and Enrichment of Ore-bearing Veins." By George J. Bancroft, Denver, Colo.
3. "Modern Practice of Ore Sampling." By D. W. Brunton, Denver, Colo.
4. "Need of Instrumental Surveying in Practical Geology." By Benjamin Smith Lyman, Philadelphia, Penn.
5. "Modern Progress in Mining and Metallurgy in the Western United States." By D. W. Brunton, Denver, Colo.
6. "The Assay and Valuation of Gold Bullion." By Frederic P. Dewey, Washington, D. C.
7. "The Cyanidation of Silver Ores in Mexico." By Albert F. J. Bordeaux, Thonon les Bains, France.
8. "The Fushun Colliery, South Manchuria." By Warden A. Moller, Tientsin, China.
9. "Protective Value of Humidity in Dusty or Gaseous Coal Mines." By James Ashworth, Congleton, England.
10. "A Study of the Ventilating System of the Comstock Mines." By George J. Young, Reno, Nev.
11. "Professional Ethics." By Victor G. Hills, Denver, Colo.
12. "An Adjustable Pyrometer Stand." By L. W. Bahmey, Palo Alto, Cal.
13. "The Ruble Hydraulic Elevator." By J. McD. Porter, Spokane, Wash.
14. "Notes on Construction of a Glass Mine Model." By Edmund D. North, Tonopah, Nev.
15. Postscript to paper, "The Behavior of Calcium Sulphate at Elevated Temperatures With Some Fluxes." By H. O. Hofman and W. Mostowitsch, Boston, Mass.
16. "Cyaniding Slime." By Mark R. Lamb, Milwaukee, Wis.
17. "Influence of Ingot Size on the Degree of Segregation in Steel Ingots." By Henry M. Howe, New York.
18. "The Filing of Assay Samples for Use in Technical Laboratories." By Louis D. Huntoon, New Haven, Conn.
19. "Dredging for Gold in French Guiana." By Albert F. J. Bordaux, Thonon les Bains, France.
20. "Mining Industry of Nicaragua." By T. Lane Carter, Bluefields, Nicaragua, Central America.
21. "Barite Industry of the United States." By A. A. Steel, Fayetteville, Ark.
22. "Federal Coal Mines in the Philippines." By Oscar H. Reinholt, Pasadena, Cal.
23. Discussion of the paper of Charles R. Keyes, "Genesis of the Lake Valley Silver Deposits." By William M. Courtis, Detroit, Mich.
24. Discussion of the paper of Henry M. Howe, "Piping and Segregation of Steel Ingots." By P. H. Dudley, New York, N. Y.
25. Discussion of the paper of Charles R. Keyes, "Ozark Lead and Zinc Deposits: Their Genesis, Localization, and Migration." By E. R. Buckley, Flat River, Mo.
26. Discussion of the paper of D. F. Hewett, "Vanadium in Peru," by James F. Kemp, New York.
27. Discussion of the paper of Hofman and Hayward, "Pan-Amalgamation: an Instructive Laboratory Experiment." By E A. H. Tays, San Blas, Sinaloa, Mexico.
28. "The Influence of Bismuth on Wirebar Copper." By H. N. Lawrie, Portland, Ore.
29. "A Study of the Critical Condition in Appalachian Coal Mines Affecting Explosions in Which Coal Dust Is a Factor." By N. H. Mannakee, Williamson, W. Va.
30. "Influence of Top Lag on the Depth of the Pipe in Steel Ingots." By H. M. Howe, New York.
31. "The Combustion Temperature of Carbon and Its Relation to Blast Furnace Phenomena." By Charles P. Linville, State College, Penn.
32. "The Conservation of Our Coal Supplies." By Edward W. Parker, Washington, D. C.
33. "The Limit of Fuel Economy in the Blast Furnace." By N. M. Langdon, Mancelona, Mich.
34. "Borax Deposits in the United States." By Charles R. Keyes, Des Moines, Iowa.
35. "Conditions and Costs of Mining at the Braden Copper Mines, Chile." By William Braden, New York.

Views, Suggestions and Experiences of Readers

Comments on Questions Arising in Technical Practice and Debatable Points Suggested by Articles in the Journal

CORRESPONDENCE AND DISCUSSION

Peroxidation of Iron in Blast Furnaces

I have read over with considerable interest the article by Antenor Rizo-Patron, entitled "Peroxidation of Iron in Blast Furnaces," published in the JOURNAL, Aug. 21, 1909, p. 367. With special reference to his experiences in this respect in copper smelting in Peru, I would like to call attention to the fact that such phenomena are probably a more frequent occurrence than is generally considered. I have had occasion to notice in a good many instances that this condition of affairs is brought about when the furnace is suffering for heat. Now, this may be by reason of too little coke, or it may be that the furnace is running slowly and too much air is passing through the charge, thereby robbing the furnace of heat.

In large copper blast furnaces this trouble is not so noticeable in the furnace as it is in the settler, when this foreign material, or magma, will collect in the fore hearths, and by reason of its interlocation in the specific-gravity column between the customary slags and matte, it will float on top of the matte and underneath the slag and keep on accumulating there as long as it is being formed, and until steps have been taken to change the condition of affairs or the settler is out of business. This condition of affairs may also be brought about from other causes as well.

I had occasion to shut down a furnace at one time when the settler was in very bad shape from this condition, and I have on hand several hundred pounds of this material; and I would be pleased to furnish samples of it to any reliable chemist who might be interested to the extent of making a chemical analysis and writing a paper thereon. A preliminary analytical report on some similar material was: Cu, 4.84; SiO_2, 19.4; Al_2O_3, 10; Fe, 44.8; CaO, 4; S, 5.6; Cr_2O_3, 0.7; ZnO, 0.8; Ag, 1.6; Au, 0.01; MnO, 1; MgO, tr. Except Cu, S, Cr_2O_3, Au and Ag, analyses of above material were made on fusions with Na_2CO_3, and the silica residue which contained insoluble black specks was refused with Na_2CO_3, and Na_2O, but the black portion was not all eliminated even then. I suppose it was some form of carbon. All the determinations of iron agreed. When analysis is calculated with iron as FeO it gives over 106 per cent. Hence as there is evidently some ferric oxide there must also be metallic iron. The sample was entirely magnetic. The Cr_2O_3 determination was made in view of the possibility that an accumulation of this acid might have occurred, as has been noted in other places; but the troubles here are purely and simply in the infusible higher oxides of iron or possibly silicates thereof.

The slag that was flowing out of the settler at the time this material was accumulating had the following analysis: SiO_2, 40.5; Al_2O_3, 8.8; FeO, 35.7; CaO, 10.3; S, 0.6; ZnO, 1.6; MgO, 0.41; MnO, 0.47.

CHAS. F. SHELBY,
Superintendent Reduction Division, Cananea Consolidated Copper Company.
Cananea, Son., Mex., Sept. 18, 1909.

Gypsum on Cape Breton Island, Nova Scotia

In the JOURNAL of Sept. 18 there appears an article by John Tyssowski on gypsum on Cape Breton Island, Nova Scotia. After describing various properties in these countries, he just touches on Newfoundland with these words: "At St. Georges Bay, Newfoundland, there is also said to be a deposit of good quality, but this is quite inaccessible, so will probably not enter into the development of the industry for some time."

There is a large deposit of gypsum in St. Georges bay, which outcrops about 500 ft. from the shore, and is quite accessible, and another large deposit of superior quality at Codroy harbor, near St. Georges, which outcrops on the shore for about ¾ mile, showing in cliffs 30 to 50 ft. high, and this is within ¼ mile from a good harbor where ships of any tonnage could be loaded.

OTTO EMERSON.
St. John's, Newfoundland, Sept. 23, 1909.

Cornishmen and Englishmen

When does a man cease to be termed a citizen of the country in which he happens to be born and reared and be known as pertaining to a particular county of that country? How would a person hailing from—say St. Louis—feel if he happened to be at an international gathering and it was reported that among those present were Germans, French, English, Americans and Missourians? Isn't a Missourian an American? It is equally as ludricrous to distinguish between the Missourians or Kentuckians and Americans as between the Cornish and English.

The foregoing arises from the statement in the JOURNAL of Aug. 14, 1909, which says "among whom are Americans, English, Welsh, Cornish and Swedes." As if Cornwall was a separate nation and the Cornish a separate race from the English! I will admit we once were a nation unto ourselves but that was away back in the tenth century, for Cornwall was finally conquered by the Saxons under Egbert and Athelstan, the latter in the year 926 proclaiming himself as "ruler of all the kings in this island including Huwal King of the Cornish, Constantine, King of the Scots" and so on. Notwithstanding all this took place more than a thousand years ago I have met many persons on this side of the ocean who still look upon Cornwall as being detached from England.

T. SKEWES SAUNDERS.
Aug. 24, 1909, Aire Libre, Mexico.

[Our correspondent is, of course, technically correct in his remarks. A Cornishman is certainly an Englishman. If it were aimed to include the Welsh, however, it would be necessary to say "British." Nevertheless, the Cornish have certain estimable characteristics—among other things they are recognized the world over as expert miners—and we fancy that this was the reason why Mr. Fleming, the contributor of the article in question, referred especially to them, just as reference is frequently made to Yankees as a variety of Americans, usually in a complimentary way.—EDITOR.]

Rope Strains in Hoisting

Referring to the article "Rope Strains in Hoisting," by C. W. Beers in the JOURNAL of Aug. 21, 1909, the formula given for "total rope strain" is:

$$\left(L+\frac{sin.\ \phi\, LF}{8000}\right)\left(sin.\ \phi+\frac{cos.\ \phi}{57.2}\right)+\frac{cos.\ \phi}{10}\left(L+\frac{sin.\ \phi\, LF}{8000}\right)\left(sin.\ \phi+\frac{cos.\ \phi}{57.2}\right)=\left[\left(L+\frac{sin.\ \phi\, LF}{8000}\right)\right]\left(1+\frac{cos.\ \phi}{10}\right)\left(sin.\ \phi+\frac{cos.\ \phi}{57.2}\right)$$

Yet Mr. Beers has only considered the stress due to the load.

Surely the stress due to winding on drums of varying diameter should be considered if a formula is to be labeled "total rope strain."

Mr. Sederholm, former chief engineer for Fraser & Chalmers, and Mr. Hewitt, of the Trenton Iron Company, have given

formulas for the stresses due to winding or bending.

It would be instructive if Mr. Beers or others would discuss the stress, due to winding and show what part it plays in the selection of a wire rope.

GUY C. STOLTZ.

Mineville, N. Y., Aug. 29, 1909.

Determination of Alunite

Though much belated, I wish to commend the publication of Mr. Gage's excellent article in the JOURNAL of June 5, 1909. I do not understand the objections Gordon Surr has found in this article. Qualitative field tests, which at the same time give an approximate quantitative result, are invaluable not only to the prospector, but also to many established mines. Too few such tests are published and I have repeatedly urged that they be compiled in book form. They would constitute one of the small volumes of a prospector's library, the publication of which would fill a serious want.

Most mines have only an assay outfit to deal with their particular ores; many smaller mines have assayers without much knowledge of analysis, or with just enough knowledge to do the routine assaying of the mine. If a rock has to be determined it is sent to a petrologist, or a perplexing mineral may be sent to an analyst, and time and money are lost. The knowledge of simple tests cannot be overrated by the practical miner. Anybody who wishes to understand Mr. Gage's article will interpret it in the way that it was intended; that alunite, found among geological and mineralogical surroundings similar to those of Goldfield, might be an indication of the proximity of gold and is worth investigating. No one who has the least idea of prospecting would expect a mine below every gossan or "peach," but every prospector who understands his business would scrutinize them thoroughly.

The knowledge of "indicators" for gold and other metals is so far behind, because every discovered indicator has been made the subject of ridicule, if it could not be proved in the same way as we determine that $2 \times 2 = 4$. We all now admit the ore associations and surface and other indications for tin, because they have been proved geologically and chemically, but many practically proven facts indicating the presence or proximity of gold or silver are called superstitions or, at best, coincidences, simply because science has not advanced far enough yet to account for them.

I remember several years ago the JOURNAL published an article on placer mining in Colombia, by Mr. Sharpless, who complained that the old Indians had marked out the richest spots hundreds of years since, and that he could not understand what "divining rod" they had used. As a matter of fact they simply used the surface indications which nature gave them. Recently I read an article about the ancient silver-lead mines in Burma. The rich leads have been worked by the Chinese for hundreds of years, while the cropping of the other poor lodes had not even been touched. Surface indications must have guided them. The JOURNAL published, on Aug. 7, 1909, some notes about the Morning Star mine in California, which after having been condemned by two experts was taken up by a miner of practical experience and paid 212 dividends. Science has grown out of practical facts and a science that denies them ceases to justify its name.

C. B.

Rama, Nicaragua, Sept. 8, 1909.

Iron in Brazil

The Rio Janeiro correspondent of the London *Economist* writes to that paper as follows: "The President of Brazil recently sent a message to Congress asking for authority to promote and assist the exploitation of the country's iron-ore deposits and the erection of smelting furnaces, by granting such facilities as would guarantee interest on the capital that might be invested in the metallurgical industry. Iron ore is very abundant in this country, especially in the State of Minas Geraes, where it is said that one range of hills alone contains sufficient to supply the world's demand for 160 years taking as a basis the present rate of consumption. The ore is of exceedingly good quality, and when smelted is said to yield a very high percentage of iron. It is found on the surface in a more or less pure state, thus facilitating its extraction at a relatively cheap cost.

"Several attempts to found and develop this industry have been made both by the government and private enterprise, but so far without satisfactory results, entirely on account of the absence of reasonable transport facilities. If special arrangements are made for bringing the ore to shipping points at reduced freights and further facilities afforded in the way of modern and adequate shipping machinery at a moderate tariff, the exportation of iron ore may be started with a very fair chance of success. The success of the smelting furnaces, however, is more problematical. In the first place, the erection and working of such important plants demand a large amount of capital and skilled labor, which would have to be imported, thus greatly enhancing the cost of production.

"The second point to be considered is the limited demand that such furnaces would be called upon to supply. The amount of iron and steel consumed in this country is quite insignificant when compared with the output that such an industry should give to pay its way, and there is little possibility of an export trade with other South American Republics. The cost of production would be above the European or North American level, and lower freights hence would certainly not make good the difference. A third difficulty is the fuel question. Coal is plentiful in Rio Grande do Sul, but it is of very poor quality, and only suitable for ordinary common purposes, and consequently useless for an industry requiring the very best coal. Further, the expense of starting coal mines in that state and shipping the coal to Minas Geraes by way of Santos or Rio de Janeiro would be too high."

American Zinc, Lead and Smelting

The annual report of the American Zinc, Lead and Smelting Company for the year ended June 30, 1909, shows the net profits of the company for that period to have been $3 per share on the company's 80,000 shares. The total net earnings from sales of zinc and lead ores after deducting cost of mining, manufacture, marketing and for promotion of the Huff processes were $360,380. From this were deducted $58,583 for general and administrative expenses and $57,351, interest on bonds and notes, leaving the net earnings at $244,445.

The net profits were appropriated, $47,264 on the mines in Missouri, $28,833 on the Kansas smelteries and $6330 for a concentrating plant in Wisconsin, the remaining $162,016 going into the special reserve fund. The total assets of the company at the date of the publication of the report were $3,452,516 against $3,166,-134 and $2,847,903 at the same time in 1908 and 1907, respectively.

According to President H. S. Kimball, in the annual report, no additions were made to the property accounts during the year and all improvements were charged off out of the profits. The additions made to the mines in Missouri consist of the purchase and equipment of the new Vogey mill and developments especially of the December tract. In connection with the smelteries, about 1500 acres of new gas lands were added to the company holdings.

During the year the company also acquired a 60 per cent. interest in the stock of the Wisconsin Zinc company.

The American Zinc Company held for a duty on zinc-bearing ores brought into the United States in the recent tariff fight and expects to benefit from the tariff imposed.

Grahamite, a valuable hydrocarbon, is found near Tampico, Mexico. Small shipments have been made. Gilsonite also is found in the same locality.

Details of Practical Mining

Notes of Interest to the Operators of Small Mines as Well as of Large Mines. The Things That Have to Be Done in Everyday Mining

REPORTS FROM EXPERIENCE

Readers of the JOURNAL are invited to contribute to this department. Articles should be brief, thoroughly practical, and preferably illustrated by drawings or sketches. Our draftsmen will prepare properly any kind of a pencil sketch that is intelligible. Something that is an old story in one district may be quite unknown in another. Articles accepted and published are suitably paid for.

Concrete Powder House

The accompanying illustration shows the type of powder house used by a large Eastern mining company. The building is about 6x12 ft., built entirely of concrete. The door and door frame are wood, but covered with sheet iron. The floor is cemented. It is used for the storage of only a few boxes of powder for immediate use at the mine. There are a number of these buildings, and each shipment of powder is distributed among them. This avoids the storage of large quantities at one place. However, we do not think that the design of these magazines is one that is to be recommended.

CONCRETE POWDER HOUSE

Extinguishing a Gaswell Fire*

At a depth of 3702 ft. the Roma Mineral Oil Company, Limited, Queensland, struck a flow of gas amounting to 1,000,000 cu.ft. per day. The gas was ignited by being blown toward the boiler plant, and burned several days before it could be extinguished. A large sheet-iron hood was built, and by means of rope and derrick swung over the well and weighted down. This shut off the supply of gas for a time and the fire ceased. After an extra length of casing was put down, the flow of gas was cut off, and drilling operations resumed.

*Annual Report of the Under Secretary for Mines, 1908.

Chemical Laboratory Sites

In too many cases little thought is given regarding the location of the chemical laboratory. Often it is in some dusty dark, out-of-the-way place, and under such conditions it is impossible to do good work, to say nothing of the comfort of the chemist. The acompanying illustration shows the new laboratory of the Oliver Mining Company, Chisholm, Minn The special features of this building are that it is light, has plenty of room, is surrounded by a beautiful lawn, and is free from the dust arising from the handling of a large tonnage of ore. It is also free from the vibration of heavy machinery.

NEW CHEMICAL LABORATORY OF THE OLIVER MINING COMPANY

Bumpers for Runaway Cars

When it is necessary to handle loaded railroad cars on a steep grade in the vicinity of the shaft headframe, there is danger of a car breaking loose and running away. In case one of these cars should strike a shaft house, the building would be wrecked. An excellent plan in a case of this kind is to have a derailing switch about 100 ft. from the shaft, and then between this and the buildings as an additional precaution a bumper may be built. The one in mind is used by the Cleveland-Cliffs Iron Company. It is about 7 ft. square, 6 ft. high, built of heavy stone laid in cement. This is about 20 feet from the shaft. Three of these are in use to protect a steel headframe in the Marquette district.

Plugging a Diamond Drill Hole

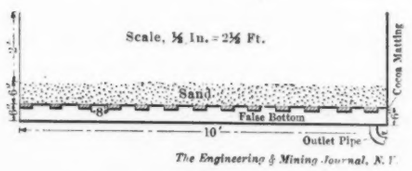
A diamond-drill hole had penetrated the hanging-wall and passed into the orebody. The hanging-wall dipped approximately 45 deg. and there was still a thin edge of ore to be extracted below the drill hole. The drill hole was 250 ft. deep and at a depth of 70 ft. passed through a water-bearing formation. In mining the ore the drill hole was encountered and a flow of water under a head of 180 ft. made it impossible to work in the bottom of the slope. The hole could not be plugged in the ordinary way from the bottom and the superintendent in charge conceived the idea of dropping a wire cable down the 2-in. hole to the main workings. The cable was attached to a windlass at the surface and a wooden plug fastened to the lower end of the rope. The plug was wrapped with small cotton rope to form a packing and thus

make a tight joint between the rock and the plug. By means of the windlass the cable and plug were drawn up sufficiently tight to keep the water out of the drift for about two hours when the pressure of the accumulated water was such as to force the water through the hanging-wall. The plug was then let down and the pump run for two hours to draw off the water. When the slope was empty the plug was again put in place and the men could work another two hours.

Sand Filters

By W. F. Boericke*

Sand filters are useful around a cyanide plant for clarifying solutions from included sediment and entail only a trifling cost for installation and maintenance. They may be constructed of any convenient size, depending on the amount of solution it is desired to filter. An ordinary box is used with a false bottom of slats, about 8 in. apart; the true bottom is 6 in. below this, as shown in the accompanying drawing. This true bottom should incline slightly toward the outlet pipe. The false bottom should be covered with a layer of



CONSTRUCTION OF SAND FILTER

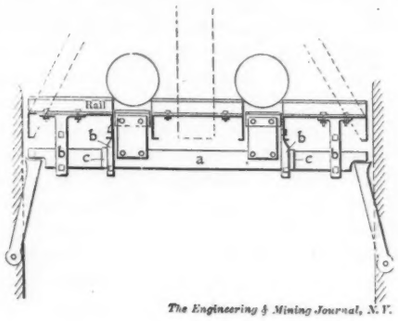
coarse cocoa matting, securely tacked down. About 6 in. of sand (40 mesh is fine enough) is spread evenly on top, and the filter is ready for use.

The solution runs quickly through the filter, and comes out perfectly clear. In case the sand gets clogged with sediment, and the solution filters slowly, the surface of the sand should be raked over. It should be changed entirely from time to time, but the cocoa matting need not be disturbed. A vacuum pump may be attached to the outlet pipe to hasten filtering.

A Safety Device for Cages at the Chapin Mine

Many accidents in mine shafts are due to carelessness on the part of the gate tenders in failing to close the bars to keep the mine car in its place. Moreover, it is possible for this bar to be knocked out of place by a projecting timber or otherwise, resulting in the car rolling off the cage and catching in the shaft timbers. The accompanying sketch shows a device that has been used many years at the Chapin mine, Iron Mountain, Mich., where it has been a success.

It consists of a drop track directly under the wheels. This track can be thrown into position only by setting the cage on both chairs. The instant the cage is lifted from the chairs the track drops down 2½ in. so that it is impossible for a car

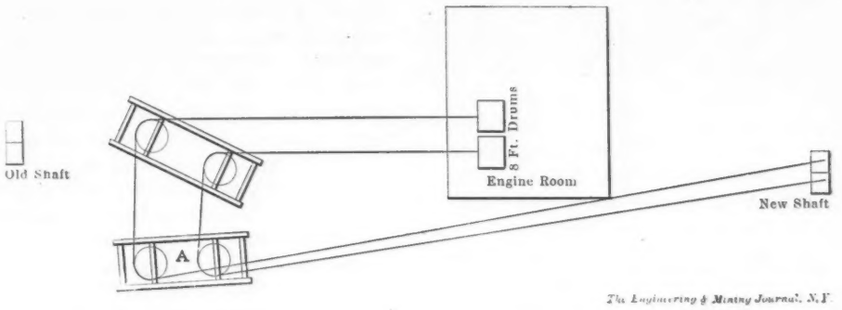


SAFETY DEVICE FOR CAGES

to roll off, even should the bars not be in place. The iron bar *a* used to support the drop track is 2x4 in. and the length of the cage. The drop section of the rail is 10 in. long. The bar is supported in a slot *b* that allows of 2½ in. play and is secured by an angle-iron lug *c* so that it cannot slip endwise. It is operated entirely by the contact of the cage with the chairs at the desired landing.

Arrangement of Sheaves at the Tobin Mine

The accompanying diagram shows the arrangement of sheave wheels that had to be adopted at the Tobin mine, Crystal Falls, Mich., in order to use the hoisting engine without turning it around. The old shaft was in ground that will eventually be mined and the new shaft was sunk 1000 ft. deep in the footwall and back of the engine room. The drums are 8 ft. in diameter, 8 ft. long and operated by a Nordberg engine. The sheave wheels which are anchored in front of the engine room are 8 ft. in diameter and held in place by 12-in. framed timbers weighted down with rock. While these additional wheels add to the friction losses, no trouble has been experienced with this plan. Three-ton skips are hoisted from the bottom of the shaft in 30 seconds. The wheels at *A* are inclined, to conform with the slope of the rope to the top of the shaft house.



ARRANGEMENT OF HOISTING PLANT AT THE TOBIN MINE

Emergency Chairs on Gallows Frame

There are numberless safety devices for winding plants which are supposed to catch and hold the cage or skip in the event of breakage of the cable. All seem to be good, and on paper or at tests will work perfectly. The weak point of all of them is, however, the fact that they depend upon springs for their action when the cable strain is released.

In mine usage joints and bearings rust and the springs deteriorate, so that when the accident finally happens the mechanism may refuse to work. Further, cables are usually broken by winding the cage into the sheave, and a force strong enough to break the cable is generally also sufficient to bend the rods and jam the moving parts of the safety clutch.

Assurance should be made doubly sure by placing a set of chairs in the gallows frame so that when the cage is pulled to the sheave the chairs will be about 6 in. below the floor of the lowest deck (a separate set for each deck would be preferable). Chairs so placed are high enough above the collar to be out of the way of ordinary work. They are always held in the shaft by weights or springs and, being above ground, there is no excuse for their not always being in first-class condition. Then when an accident occurs, if the dogs of the clutch fail to work, the cage cannot fall down the shaft.

Having the tool "nipper" collect the miners' lunch buckets and send them up to the change house not only saves the men trouble but often removes the temptation of high-grading.

*Mining engineer, Cobalt, Ontario.

New Publications

REPORT ON THE IRON ORE DEPOSITS OF NOVA SCOTIA, PART I. By J. E. Woodman. Pp. 226, illustrated 6¾x 9½ in., paper. Ottawa, 1909: Government Printing Bureau.

LES FABRIQUES DE PETROLE DE ROUMAINE PAR RAPPORT A LA LOI DE LA CONTINGENCE DE 1908. Par l'ing C. Hallaceanu. Pp. 102, illustrated, 9½x 12½ in., paper. Bucarest, 1909: *Revue du Petrole.*

STEAM POWER PLANT PIPING SYSTEMS: THEIR DESIGN, INSTALLATION AND MAINTENANCE. By William L. Morris. Pp. 490, illustrated, 6½x9¼ in., cloth, $5. New York, 1909: McGraw-Hill Book Company.

COMMISSION D'ENQUETE SUR LA DUREE DU TRAVAIL DANS LES MINES DE HOUILLE: STATISTIQUE DES ACCIDENTS MINIERS. Par L. Delruelle et A. Delmer. Pp. 501, illustrated, 8x11 in., paper. Bruxelles, 1909: E. Daem.

REPORT OF THE MINISTER OF MINES, 1908. By Richard McBride. REPORT OF BUREAU OF MINES. By William Fleet Robertson. Pp. 269, illustrated, 7½ x10 in., cloth. Victoria, B. C., 1909: Printed by Richard Wolfenden.

SUMMARY REPORT OF THE MINES BRANCH OF THE DEPARTMENT OF MINES FOR THE NINE MONTHS ENDING DECEMBER 31, 1908. Sessional paper No. 26a. Pp. 96, 6½x10 in., paper. Ottawa, 1909: Printed by C. H. Parmelee.

A SKETCH OF THE GEOGRAPHY AND GEOLOGY OF THE HIMALAYA MOUNTAINS AND TIBET. Part IV: THE GEOLOGY OF THE HIMALAYA. By S. G. Burrard and H. H. Hayden. Pp. 207-308, illustrated, 9x12 in., paper. 2 rupees. Calcutta, 1908: Office of the Trigonometrical Surveys.

A GEOLOGICAL RECONNAISSANCE IN NORTHERN IDAHO AND NORTHWESTERN MONTANA. U. S. Geological Survey, Bulletin 384. By F. C. Calkins. NOTES ON THE ECONOMIC GEOLOGY. By D. F. MacDonald. Pp. 112, illustrated, 6x9 in., paper. Washington, 1909: Government Printing Office.

GEOLOGICAL REPORT UPON THE GOLD AND COPPER DEPOSITS OF THE PHILLIPS RIVER GOLDFIELD. By Harry P. Woodward. DESCRIPTION OF THE CRYSTALLINE ROCKS OF THE DISTRICT. By E. S. Simpson and L. Glauert. Pp. 109, illustrated, 5½x8¼ in., paper. Perth, 1909: Fred Wm. Simpson, Government Printer.

BENEFICIO DE METALES DE PLATA Y ORO POR CIANURACION. By Ferdinand McCann. Pp. 354, illustrated, 6½x9½ in., cloth, $5. Mexico City, 1909: Published by the author.

Mr. McCann has produced in Spanish an excellent practical and scientific treatise on cyanidation that is worthy to rank with the standard books in English on the subject, both in matter and presentation. It is necessarily in part a compilation, but back of it is the author's extended experience, particularly in the Mexican field, and a wide and intelligent study of the actual methods and results in the leading camps. The main text of the book, devoted to the theory and practice of cyanidation, is clear, concise and complete, and also sufficiently scientific to put the book above the class of manuals for beginners of which there are already too many. The chapters given to the practice and results in the leading Mexican mines —El Oro, Dos Estrellas, Mines of Mexico, Esperanza, Guanajuato Consolidated, Real del Monte y Pachuca, Coscotitlan, Hacienda San Francisco at Pachuca and San Rafael—are of timely interest and of great value, although from the progressive nature of the subject are somewhat transitory for a book. Other chapters deal with special problems of cyanidation and present useful tables. The book is well illustrated. The wide application of cyanidation in Spanish-American countries makes the publication of this book in Spanish particularly appropriate. It will serve the increasing number of Spanish-speaking engineers who are rapidly realizing the urgent need of knowledge of the subject and also will be of interest to the English-speaking metallurgists who can read it and who will find in it a practical lexicon for the technical phrases of the business.

ORE DRESSING. Vols. III and IV. By Robert H. Richards. Pp. 1199 to 2052, illustrated. 6½x9½ in., cloth, $5 per volume New York, 1909: McGraw-Hill Book Company.

Richards' "Ore Dressing" is one of the classics of our mining and metallurgical literature. It appeared as a two-volume book in 1903. Since that time advances in the art of concentrating ores have been exceedingly rapid and in some instances well-nigh revolutionary. "Investigations have been made for the purpose of explaining the principles of ore separation," says Professor Richards in his preface to Vol. III, "new concentrating devices have been invented and installed in the mills, and the mills themselves have been greatly improved. For these reasons the time seems to have come to bring the subject up to date. When this present work was started in October, 1906, it was thought that something in the nature of a small supplement or appendix would suffice and on this basis the collection of material was undertaken. It soon became apparent that the new work would rank in size with Vols. I and II, and hence naturally receive the titles of Vols. III and IV. The idea of revising and rewriting Vols. I and II seemed to be prohibited by reason of the fact that the machines and the mills are so completely interwoven on almost every page that no method of revision appeared adequate to the task."

The above remarks amply express the scope of the two new volumes. In brief, they bring the subject as nearly up to date as the limitations of printing and proofreading permit. In doing this Professor Richards has made a painstaking examination of the recent literature and has visited most of the new mills of the United States, at the same time continuing his experimental work in the laboratory of the Massachusetts Institute of Technology. No reader of the book, however casual, can fail to be impressed by the hugeness of the task of its distinguished author and his indefatigable industry in performing it. Richards' "Ore Dressing" is the encyclopedia of its subject.

REPORT ON THE INVESTIGATION OF AN ELECTRIC SHAFT FURNACE, DOMNARFVET, SWEDEN. By Eugene Haane. Canadian Department of Mines, Mines Branch, Pp. 38; 10x6½ in.; paper; illustrated. Ottawa, Canada; O. H. Parmelee, King's Printer, 1909.

This report embodies the latest results of the series of experiments in electric smelting which, begun under Dr. Haanel's direction at Sault Ste. Marie, Ont., in the winter of 1905-6, were continued in Sweden with the improvements in the plant suggested by experience, and brought to a satisfactory conclusion in December, 1908. The first part gives a full description with diagrams, of the Domnarfvet furnace, amplifying the details of its design and operation previously published at some length, and sets forth the results of the trial runs witnessed by Dr. Haanel. An important feature is the comparison of the cost of the production of pig iron in the charcoal blast furnace with that produced in the electric shaft furnace by Professor Von Odelstierna of Stockholm, under conditions as they exist in Sweden, using ore containing about 60 per cent. of metallic iron and charcoal containing 83 per cent. carbon. A charcoal blast furnace in Sweden produces about 8000 to 10,000 short tons of pig iron per year, a quantity which the professor believes can be produced in a properly constructed electric-shaft furnace. On this basis the advantage would be $1.54 per ton in favor of the electric furnace, the figures being $10.10 per ton for the charcoal blast furnace and $8.56 for the electric process. The saving is all in the charcoal used, the quantity being 0.95 ton in the blast furnace and 0.27 ton in the other. The inventors of the electric shaft furnace have patented an electric steel furnace possessing some novel features and an abstract of the Swedish patent specifications, showing these improvements in detail, is given. The report also includes a description of the modern process for the manufacture of electrodes for electric furnaces, and the latest methods of charcoal manufacture.

Personal

Mining and metallurgical engineers are invited to keep THE ENGINEERING AND MINING JOURNAL informed of their movements and appointments.

W. G. Page was recently in Winnemucca, Nev., examining some mines.

S. J. Taylor, of Milano, has been appointed State mine inspector of Texas.

J. B. Empson, metallurgist, of Mexico City, has just recovered from typhoid fever.

Wm. L. Spry, of Kenora, Ont., has been appointed recorder for the Kenora mining division.

Whitman Symmes is superintendent and engineer of the Ward Shaft Association at Virginia, Nevada.

Alfred H. Brooks, of the U. S. Geological Survey, has been visiting the Fairbanks district in Alaska.

James MacNaughton, general manager of the Calumet & Hecla company is in the East on a short visit.

Emil Lundquist, of Salt Lake City, Utah, is acting manager of the Newhouse Mines and Smelters Company.

Charles Miller, of Los Angeles, Cal., is in Goldfield, Nev., superintending changes in the Goldfield-Silver Peak mill.

F. Karl Lamb has gone to Edwardsburg, Idaho, for the Eagle Mining Company which is constructing a mill and cyanide plant.

H. A. Kennedy is construction engineer for the Yoquive Development Company for the erection of the new plant in Chihuahua.

E. C. Musgrave, who recently returned to British Columbia from Mexico, has been examining mines in the Portland canal district.

George B. Farish, recently in the City of Mexico, is now in New York. His address is at the Columbia University Club, 18 Gramercy park.

W. L. Loveland, for 19 years with the Allis-Chalmers Company, has been appointed general manager of the Mine and Smelter Supply Company.

Wm. H. Goetz, recently of the Bagdad Mining Company, of Idaho, has become connected with the Yellow Aster Mining Company, of Randsburg, California.

Thomas F. Cole has been elected president of the Giroux Consolidated Mines Company, in place of Joseph L. Giroux, who has resigned on account of ill health.

James Johnston, metallurgical engineer for Charles Butters & Co., Ltd., was recently in Milwaukee, Wis., on his way from Copala, Mexico, to New York and London.

T. B. Drummond, formerly manager of the Newhouse Mines and Smelters Company, has been appointed general manager of the Inspiration Copper Company at Globe, Arizona.

Charles Duncan, lately connected with the Bethlehem Steel Company, has been appointed superintendent of the Lake Superior Corporation's steel-rail mill at Sault Ste. Marie, Ontario.

C. H. Plumb, mining engineer, has bought the office equipment and practice of the Michel-Cooke Engineering Company at Joplin, Mo., and will largely extend his business as consulting engineer.

A. W. Hudson, formerly metallurgist at the Cobar smelting plant, has been made manager of the smelting and electrolytic plant of the Great Cobar Mining Company, Ltd., at Lithgow, New South Wales.

Ira W. McConnell, supervising engineer in the reclamation service, has resigned to go into private practice. He is a graduate of Cornell University, and has been in the Geological Survey over six years.

Dr. Milton L. Hersey, of Montreal, is in Cobalt, Ont., arranging for the development of three mining properties in the Gillies Limit, recently purchased by himself and Ascher Pierce from the Ontario government.

J. H. Lanyon has resigned his position as superintendent of the Calumet & Montana Mining Company in Beaverhead county, Mont., and has been appointed superintendent of the Idaho Mining and Development Company.

A. E. Hodgkins, who has been in charge of the purchasing and accounting department of Witherbee, Sherman & Co., Inc., at Mineville, N. Y., has been appointed general manager of the Cheever Iron Ore Company, at Port Henry, New York.

W. O. Walker has been appointed associate professor and George F. Guttman assistant professor of chemistry at Queens University, Kingston, Ont. Mr. Guttman is a son of Dr. Oscar Guttman, the celebrated English authority on explosives.

Paul C. Kuegle has resigned his position as chief inspector of the Youngstown Sheet and Tube Company, Youngstown, O. He sailed from New York Oct. 9 for Sakchi, India, and will be employed as chief inspector of construction for the Tata Iron and Steel Company.

Dr. Charles B. Dudley, for many years head of the testing department of the Pennsylvania Railroad, was elected president of the International Association for Testing Materials at the convention recently held at Copenhagen, Denmark. The next convention of the association, in 1912, will be held in the United States.

Obituary

Augustus H. Phelps died at Denver, Colo., Sept. 29, aged 62 years. He had been engaged in mining in Colorado for nearly 30 years, and owned large interests in the San Juan district, and also in Idaho.

Patrick Hurley died at Park City, Utah, Sept. 21, aged 35 years. He was for a number of years employed by the Silver King company, and for several years past was superintendent of the Kearns-Keith mine.

John M. Grice was killed by an explosion of dynamite in the Perequina mine, Guanajuato, Mexico, Sept. 15. He was 28 years old. He was born in Kansas and graduated from the Massachusetts Institute of Technology. He was well known in Mexico, and for some time past had been employed as a mining engineer by the Esperanza Mining Company.

Samuel Queen Brown, president of the Tide Water Pipe Company, the Tide Water Oil Company, and the Associated Producers' Company, died in New York, Oct. 5. Born in Pleasantville, Penn., in 1834, Mr. Brown received his education at Alleghany College. For 15 years he was commissioner of the Second Geological Survey of Pennsylvania. For many years he has been well known in the oil trade.

Rasmus Hansen died at Silverton, Colo., Sept. 28, aged 62 years. He was born in Denmark, but came to this country when a young man and settled in Colorado. After working in mines in Gilpin county for several years he went to San Juan county in 1870 and had resided there ever since. He owned and developed several good mines, the best known being the Sunnyside Extension, from which he realized a large amount.

Kenneth Robertson, aged 64, died at Portland, Ore., Sept. 26. Until a few years ago he was prominently known as an expert blast furnaceman and mineralogist wherever pig iron was made in this country, and was identified with the Sloss interests in Birmingham, Ala., for years, also with the Duluth Furnace Company, in Minnesota, and the Pardee interests in New Jersey. He was born in Madison county, Ala., and served in the Confederate army. After the war he entered the School of Mines of Columbia University, New York, and graduated with honors, later following this training by opening one of the first chemical laboratories in Pittsburg, with his brother Richard. He leaves a widow, two daughters and two sons.

Societies and Technical Schools

Venezuela Mining Congress—A correspondent writes from Caracas that an international mining congress in Venezuela is being organized, with prospects of success.

Appalachian Engineering Association—The next meeting will be held in Washington early in November. The sessions will last two days and several valuable papers have been promised, and will be submitted for discussion.

Special Correspondence from Mining Centers

News of the Industry Reported by Special Representatives at Butte, Denver, Salt Lake City, Goldfield, Cobalt and Toronto

REVIEWS OF IMPORTANT EVENTS

San Francisco

Sept. 30—At Marigold on the Yuba river, seven miles above Marysville, there are now four gold dredges at work and at Hammonton, three miles above Marigold, there are fourteen. This makes 18 gold dredges now working in what is known as the Marysville field of Yuba county, which is four more than were at work there in the year 1908. The new machines are all of the largest size and most improved type and are doing an immense amount of work. The ground worked in this field runs very evenly. In course of time it is evident that there will be more dredgers in the Marysville than in the Oroville field. On the Yuba, the area of available dredging ground is quite large. It is deeper than at Marysville and is easily dug. For years those lands along the Yuba river were considered absolutely worthless and in some parts nobody would pay the taxes on them. Some persons who bought such lands at tax sales years ago for nominal prices have made fortunes out of sales since the ground was found to be available for gold dredging purposes. Some parcels bought for 25c. an acre have since been sold at $2000 per acre. The committee from the Anti-Dredge Convention which visited this Yuba field, found that all the dredges operating were land-locked and that the material was all being impounded and not allowed to pass into the streams.

R. L. Van Wormer and associates have installed a suction dredge lately a few miles east of Marysville, on the Yuba on the Stevenson estate ground. This is a sort of combined reclamation and mining scheme. The plant consists of a five-inch centrifugal pump run by a 30-h.p. electric motor. The material is raised 76 ft. and spread out over the land in order to raise it higher for purposes of cultivation. The material raised with the water is passed first through a series of sluice boxes to save the fine gold and is then carried on to the land. The gold found is exceedingly fine.

Denver

Oct. 2—In the remarkable Carbon Lake mine, owned by the San Antonio company, in the Red Mountain district between Ouray and Silverton, a strike has been made of stromeyerite, a kind of ore that in the Yankee Girl and Guston mines made that district celebrated in '84 to '86, one carload of the ore from the Yankee Girl yielding $80,000, with silver $1.10 per ounce. A great boom existed for some years, collapsing in '93, with the fall in silver, and the failure to find any more of the marvellously rich ore. These two mines alone are credited with a production of upward of six millions. The ordinary ore of the Carbon Lake is enargite or arsenical copper ore, but the copper-silver-glance ore is found below the enargite, and is associated with bornite. The discovery again of ore of the same phenomenally rich character as that found between '83 and '93 is going to stimulate mining to a very great degree in Red Mountain.

The Mono-Baltic Mining and Smelting Company, owning adjacent properties, is going to erect at once a 200-ton smeltery for its ores. The president of the company writes from Boston contradicting the report that a consolidation of the San Antonio company, here also contemplated. M. T. Chestnut, manager of the San Antonio company, here also contradicts the consolidation rumors.

The Guadalupe mine, an early producer of rich copper ore, carrying silver, also near Ironton, Ouray county, is to the fore with a rich strike by leasers.

In the Cripple Creek district, the Worcester ventilating system is said to be proving very successful in enabling several of the deep mines, which have been idle on account of the foul gas encountered, to be again actively worked. Five to six feet of ore, running 1¼ oz. of gold to the ton, is reported as having struck in the 8th level of the Rexall mine, under Victor. The Granite, also in Victor, is shipping from three to five carloads of high-grade gold ore daily. The new machinery erected on the Gold Sovereign mine, to take the place of that burned some time ago, has been completed, and mining and production on a large scale will be at once begun. The mine is operated by a leasing company, of which the manager is Mr. Clements. The stockholders in the Gold Dollar Consolidated company will receive on Oct. 10, a dividend at the rate of ½c. a share, the amount being $12,500, a total of $37,500 paid during this year. It is reported now that the rich veins of Bull Hill, which cross the gulch into or under Big Bull Hill, and which in the latter have never shown pay values from the surface, are producing rich ores in the underground workings of a Bull Hill mine, which have been extended eastward under Big Bull. It has always been believed by Cripple Creek miners that this would ultimately be the case, but not until now has it been reported as accomplished. The claim under which it is found was purchased some time ago by the Golden Cycle company, which is now bringing the ore to the surface. Lessees on the Hiawatha, Little May and Prince Albert, on Beacon hill, are all very busy with new discoveries of rich ore, and mining the old ones, and a good tonnage of high-grade gold ore is going out. The Victor mine, under lease, has shipped from 500 to 600 tons during the past month, of a value of from $10 to $35 in gold per ton.

One of the greatest engineering feats of the West was finished on the 23d, when President Taft touched the electric button at the mouth to the Gunnison tunnel, lifting the headgates at the entrance, six miles distant, and the immense flow of water was available for irrigation. This tunnel was built by the Government under the reclamation act, and cost between three and four millions of dollars; is 30,582 ft. long, and has a capacity of 1300 cu.ft. of water per second. It will irrigate 200,000 acres, and supply power for the Uncompahgre valley.

Goldfield

October 2—At the serious cave-in on the 25th, the 9 cyanide tanks of the old Combination mill were engulfed and the mill placed entirely out of commission for all time. Unfortunately 3 men lost their lives. The intention of the management already announced to dismantle the old mill is forestalled by the accident. The mine was not injured except that the output will be temporarily curtailed. The top of the stope under the mill was 200 ft. from the surface, and was well timbered with square sets of Oregon pine. It is believed the seepage and vibration of the mill contributed to the mishap.

The estimated production of the Goldfield district for the week ending Sept. 25 is 6520 tons, gross value $250,707.

The case of R. P. Dunlap, receiver of the Round Mountain Banking Corporation, vs. F. E. Browns, trustee of the Round Mountain Hydraulic Mining Company, occupied the attention of the district court at Tonopah last week. The case involves the title of the pipe line and the life of Round Mountain. So soon as a clear title to this five-mile line is rested permanently new life will appear at Round Mountain and four or five mills will again begin the reduction of ore already

mined and awaiting a market. The Round Mountain Mining Company is the only property not affected by the pipe-line litigation as it has its own water supply and pipe line.

An important project for the development of power on the Colorado near Las Vegas is under way. The project is headed by Count C. E. Apponyi, an Austrian army officer who made a trip down the river in 1871. He has the backing of important European interests according to report. The first installation plan is for 30,000 h.p., which it is proposed to deliver to the Arizona-Nevada mining camps.

Butte

Sept. 30—The mines of Butte were closed down for four days beginning Friday of last week and ending Monday as a result of the differences between the Miners Union and the Engineers Union in Butte. During this period the only mine in the district which continued to work was the Butte & Boston Company's Silver Bow, where the hoisting engineers remained loyal to the Western Federation. The withdrawal of the engineers from the Western Federation of Miners a week ago resulted in the Butte Miners Union deciding that none of its members should work at mines where the seceding engineers were employed and on Friday morning of last week this order was put into effect with the result that all of the mines in camp with the exception of the Silver Bow were closed down. The trouble seemed serious for several days and it was thought that there might be an indefinite cessation of work but on Monday the seceding engineers decided to return to the Western Federation of Miners and that same day the local miners' union ordered its members to resume work. It is estimated that the miners of the camp lost $150,000 in wages and the producing companies $112,000 in lessened production, making more than a quarter of a million dollars loss caused by the labor trouble. During the whole of the trouble the Amalgamated officials refused to take an active part and the final settlement was wholly due to the efforts of the labor leaders themselves.

Interests headed by President J. J. Hill of the Great Northern Railway have come to an agreement with President J. Herbert Anderson of the Idaho Smelting and Refining Company whereby the Hill interests have agreed to furnish sufficient capital to treble the capacity of the Ponderay smeltery and keep it in operation, provided President Anderson can secure enough contracts to keep the smeltery running the year round. Anderson has just returned from a trip east where it is supposed he was trying to get contracts and it is reported that he will soon make a trip to Montana for the same purpose.

The annual meeting of stockholders of the North Butte Extension Development Company will be held at Portland, Me., Oct. 19. In anticipation of this meeting Dudley A. Tyng & Co. have sent out a circular letter asking for proxies. The letter states that the present management has been pursuing a policy which does not benefit the stockholders, in that it has used certain funds of the company for payments upon options instead of using it for further development work. Tyng & Co. offer to make a loan to the company sufficient to go ahead with development work, provided an efficient board of directors is elected at the coming meeting.

The annual meeting of stockholders of the Davis-Daly company, may not be held until some time later than was originally intended, since a temporary restraining order preventing the holding of the meeting, has been granted by the Maine courts, on the application of Newman Erb and S. M. Jarvis. The ground upon which the restraining order was issued was that there had been no sufficient notification to stockholders of the time and place of the meeting. The restraining order is returnable on Oct. 12 at which time a hearing will be had and the matter of the sufficiency of notice will be passed upon. Mr. Erb has made public his grounds for his objection to Mr. Heinze's continuing in control of the company, and in a recent statement has charged that Heinze has placed the company's funds on deposit in banks where he had a personal indebtedness and has also kept men on the company's pay roll who had not been in Butte for months but who were working in other parts of the country. Each side confidently claims a majority of the votes at the coming meeting but as yet no definite information can be had as to the relative strength of the contending parties.

Salt Lake City

Oct. 2—D. C. Jackling, manager of the Utah Copper Company, denies the reports that the difficulty has been experienced in the steam-shovel operations on account of the men refusing to work under the higher walls, and also denies that the company cannot mine the upper end of the Mackintosh tunnel by steam shovels and that it will use the caving system in mining in this part of the property. He says, "These reports are entirely unwarranted."

In case of the Silver King Consolidated Company against the Silver King Coalition, the United States circuit court has rendered a decision which establishes the responsibility of the Coalition company for the acts of its predecessors, the Silver King Company. The Consolidated company is seeking to recover damages for alleged trespass.

Progress has been made during the last month on the new Tooele plant of the International Smelting and Refining Company. Work has been started on the roaster building and the blacksmith and machine shops are nearly completed. The steel is in place on the power house and the masons have started on the walls. A subcontract has been let for the building of the smokestack and work has begun on the concrete foundation. The material for the building of the high line tramway to Bingham is on the ground and it is being transported to the top of the range.

The Highland Boy smelter, ten miles southwest of Salt Lake City, has been razed and the structural steel and building material taken to the International smelter at Tooele. This plant has been idle for two years when it was closed by the United States court in the smelter-smoke decision. The town of Highland, supported by it, is deserted.

The annual meeting of the New York Bonanza Mining company was held during the week. The affairs of the company and the condition of the mine at Park City were found satisfactory. It was decided to sink a deeper shaft to better handle the mine's production. W. W. Armstrong and F. W. Sherman, superintendent of the Daly-West mills, were elected to the board of directors.

Cobalt

Oct. 3—There is a big building boom in Cobalt, and several large concrete and brick buildings are being put up, and a great number of frame buildings. In that portion of the town which was destroyed by fire 150 new buildings are being erected, this, notwithstanding the excessive ground rent which is charged by the Nipissing Mining Company. On the principal street these ground rents amount to about $1 to $1.25 per foot of frontage per month.

A few days ago the crosscut from the MacDonald vein at the La Rose cut under the No. 10 vein, which had formerly been worked from a tunnel. The vein was cut 70 ft. below the tunnel level and shows about 3 inches of very high-grade ore. During the past fiscal year of the company this vein has produced 200,000 oz. of silver from above the tunnel and also a large amount of high-grade ore has been blocked out.

A vein of very high-grade ore has been struck in the winze sunk from the lower level of the No. 3 shaft of the Kerr Lake mine. A short time ago a crosscut was started from the bottom of the winze to cut the Jacobs vein at this level. The vein is about 12 in. wide and carries very high silver. So far these workings are the deepest in the camp, and as far as can be ascertained, the ore continues to carry as high grade as on the surface.

During the past week several more of the lots in the Gillies Limit have started work. Dr. Milton Hersey was here a short time ago examining the Pierce lots, and he has purchased a half interest in

these. It is also understood that the Young-O'Brien lot has been sold to a Montreal syndicate for $250,000. This claim was purchased in the first government sale for $10,500, and up to date but little development has been accomplished. Its value lies in the fact that the Waldman vein has been traced on it for a considerable distance. The shaft on the Waldman vein is now down 60 ft., and the ore in the bottom still continues good.

At the recent annual meeting of the Temiskaming & Hudson Bay Mining Company at New Liskeard the number of the directors was reduced from 11 to 7. It was also decided to erect a concentrator, but it is not likely that work will be commenced on this before next spring. It was also formally announced that the Coleman Township properties had been made over to the Hudson Bay Mines. The financial statement for the year ending Aug. 31 showed that the dividends paid totaled 2400 per cent., amounting to a disbursement of $186,264. During the year a total of 954,000 oz. silver was produced.

The Cobalt Central Company passed the dividend for this quarter, and it is stated as a reason that the funds will be used in the construction of additions to the concentrator. This will necessitate an expenditure of about $30,000, and this could not have been met had the dividend been declared. It is stated that the capacity of the mill will be increased from 80 to 120 tons per day. Up to date this company has paid 4 per cent. on an issued capital of $4,761,500.

The second cyanide plant in the camp, which is at the O'Brien mine, has started operations. This mill is equipped with 30 stamps, 10 of which are to be used for concentrating, and 20 to crush the ore for the cyanide plant. The Moore process will be used for treating the slimes. The other cyanide plant is in operation at the Buffalo, and is treating only the slimes. About 90 per cent. extraction is being made, and the present capacity of the plant is 17 tons per day. This will shortly be increased. The plant at the Buffalo was designed and installed by Groch & Groch, Cobalt. These engineers believe that in future nearly all the mills will be equipped with cyanide plants for treating the slimes. They consider, however, that the concentrating that is being done will produce sands of such low value as to preclude the possibility of working them on a commercial basis.

Another incident in the Peterson Lake litigation occurred lately, when David M. Steindler, of New York, issued a writ against A. E. McLaren, of Stratford. These gentlemen are the heads of the two factions in this Cobalt dispute. Mr. Steindler asks for a declaration that Mr. McLaren is not lawfully the president of the Peterson Lake, and is wrongfully assuming to act as such, and that the plaintiff, Steindler, has been the lawful president since June, 1909. Mr. Steindler also asks for an injunction restraining Mr. McLaren from acting or assuming any part in the duties of the president of the Peterson Lake Company.

Toronto

Oct. 2—A statement issued by the Ontario Bureau of Mines shows that the total mining and metallurgical output of the province for the first six months of 1909 was $10,649,923 as against $8,082,264 for the corresponding period of 1908. The shipments of ore and concentrates from Cobalt during the half year amounted to 15,360 tons, as against 9209 tons for the first half of 1908—the increase in the quantity of silver content being about 45 per cent. Nickel increased 26 per cent. in quantity and pig iron about 44 per cent. The detailed statement is as follows:

	Quantity.	Value.
Arsenic, tons	1,517	$28,320
Gold, oz.	741	14,011
Silver, oz.	11,234,382	5,379,980
Cobalt, tons	263	46,117
Copper, tons	3,741	529,775
Nickel, tons	6,027	1,234,620
Iron ore, tons	87,738	217,341
Pig iron, tons	211,583	3,197,759
Zinc ore, tons	200	2,000

The annual report of Commissioner Alexander Henderson, of Yukon Territory, gives the total gold production of the territory for the last fiscal year ending March 31 as 217,350 oz. valued at $3,260,263, an increase of $440,000 in value over the preceding year. The amount of royalty collected on gold was $81,507. The report says that the completion of the water system by the Yukon Gold Company will enable it to begin operations on a large scale. It will operate seven dredges and three hydraulic elevators. Experiments with quartz have led to the belief that the time is not far distant when the numerous quartz propositions will add materially to the wealth of the territory.

Mexico

Oct. 1—The Santa Gertrudis Company has officially ratified the proposition of the Camp Bird, Ltd., and it is believed that the deal will certainly be concluded. Apparently the negotiations between the Camp Bird company and the La Blanca are at an end. It is reported that the Exploration Company of London, represented by R. M. Raymond, is now figuring on the La Blanca. This company is affiliated with the El Oro company. The outcome of the Santa Gertrudis deal has given greater confidence in Mexican propositions and in silver than anything that has happened for a long time.

The English interests back of the concession for a railroad from Toluca in the State of Mexico to the Pacific coast are evidently planning to proceed with the construction. The line will cross the Rio Balsas and reach the Pacific coast at Orilla at the mouth of the river. It will open up a rich agricultural country and furnish an outlet for several important mining camps. At the Pacific terminus of the road are the large iron deposits known as Las Truchas.

The Southern Pacific extension from Guadalajara has now been completed to Magdalena, 25 km. from Tequila. This temporary terminus will serve as a station for the Hostotipaquillo district. Considerable machinery is now awaiting shipment over the new link.

The steamship companies plying between Vera Cruz and Tampico, the Gulf Ports, make a very low rate for zinc ore to Europe. The rate at present is 13s. 6d. to Antwerp and 21s. to Swansea. This rate is for ore in sacks in lots less than 100 tons. The boats make frequent sailings, and the facility for shipment from the Gulf ports is very good. Likewise favorable rates are offered on the Pacific Coast ports by the Kosmos line and other lines for ores for Europe, either around the Horn or over Tehuantepec road to the gulf, and thence to Europe.

Considerable interest is expressed in the purchase of the Pan-American railroad by David E. Thompson, now American ambassador to Mexico. Mr. Thompson, who is an experienced railroad man from Nebraska, has resigned as American minister, to become effective Dec. 30. He has been in negotiation for this line for some time, and now announces that the deal is practically closed and that extensive improvements will be made in connection with the line. The road runs from a point on the Tehuantepec railroad in southern Mexico, along the Pacific coast to the boundary of Guatemala. It has been recently constructed, and is not very well equipped, but has had an extensive business from the outset. There are important copper deposits in the vicinity of this line, which are now being investigated by English engineers. It is expected that the line will connect with some of the projected Central American lines, and furnish a direct outlet and a through railroad route in connection with established lines from Central America as far south as Panama to United States points.

London

Oct. 1—The prospectus has been issued of the Brazilian Golden Hill, Ltd., formed to acquire from the Brazilian Goldfields, Ltd., rights over 360 acres on a portion of the estate of the Brazilian Goldfields in the state of Rio Grande do Sul, South Brazil. The property has been reported on by E. A. Mannheim and Andre P. Griffiths, mining engineers, who state that it contains several gold-bearing lodes upon which encouraging prospecting work has been carried on. The capital of the new company is £1,115,000, of which £59,993 represents the vendor interest. The subscription of the issue, which has been underwritten, will provide a working capital of £30,000.

Mining News from All Parts of the World

New Enterprises, Installations of New Machinery, Development of Mines and Transfers of Property Reported by Special Correspondents

THE CURRENT HISTORY OF MINING

Alaska

Cordova—The California-Alaska company, whose property is in the Kotsina district, has a 16-ft. vein which has been traced 1800 ft. B. F. Clark, superintendent.

Yukon Gold—The great ditch was completed Sept. 21, reaching Gold hill. The water is conveyed 70 miles, the cost was $10,000,000. This is one of the greatest engineering undertakings in the history of the north.

Fairbanks—Late reports of the stampede to the Iditarod country from Innoko confirm the earlier statements. Fifteen hundred men are now in the district.

Seward—A strike has been made on the Eagle river, a tributary to Knik Arm. The ore is similar to that of the Moose pass region.

Penn-Alaska—Machinery has been purchased. Jesse Blakley, manager.

Cahoon—The company is working pay gravel. A new black-sand device is installed.

Arizona

COCHISE COUNTY

Great Western—The power plant owned jointly with the Copper Queen at Courtland is completed. It will supply electricity and air to the four shafts of these companies.

Calumet and Arizona—The April Fool shaft at Courtland is down 500 ft., and drifts started. Ore shipments from the Germania are being made.

Tombstone Consolidated—The two pumps and the compressor to recover control of the water at 1000-ft. level have been shipped. The pumps are the Prescott Duplex, capacity 1200 gal. per min. under 1000-ft. head, duplicate of those now at 1000-ft. level. The compressor is a cross-compound condensing Nordberg, capacity 4000 cu.ft. per min. of free air to 100 lb. per sq.in. When this equipment is installed at 800 ft. the control of the water to 1000-ft. level will be easily maintained.

GILA COUNTY

Arizona Commercial—The new smeltery at Globe is now in operation. It has a daily capacity of 500 tons. The mine is taking out ore from the 600-ft. level.

Cactus—The company is carrying on extensive development at Globe. The Hamilton shaft is in ore 100 ft. from 275 ft. The Pinto shaft is being sunk to 500 ft. Levels and crosscuts are being driven to block out the ore. C. W. Prichett, manager.

Hercules—Two drills are now at work on this property adjoining the Ray Consolidated at Globe.

Ray Consolidated—At the New York meeting the old directors were reëlected excepting the addition of Charles Hayden and W. Hinckle Smith to succeed the two English directors.

Gila Copper—The directorate has been reëlected except A. Chester Beatty succeeded Mr. Wiseman.

Miami—Underground work is devoted to blocking out ore. General Manager Lewis A. Wright estimates of deposit as far as developed at 13,000,000 tons. It will be about a year before the concentrator is completed.

Superior & Boston—The preliminary work for the new McGaw shaft is completed and equipment installed. It will be sunk between the Old Dominion fault on the north and the great Eastern fault on the south, and will cut great eastern fault at 1000 ft. and be the working shaft for the property.

MARICOPA COUNTY

Vulture—Three levels have been opened below the old workings to a total depth of 600 ft. The east incline shaft is being retimbered. About $100,000 has been expended in development. A 100-stamp mill is planned, a 20-stamp unit of which will be erected at once. A special cyanide process will be used to treat the ore which is gold. W. Spencer Hutchinson is engineer.

PIMA COUNTY

Imperial—September output is estimated at 750,000 lb. copper.

SANTA CRUZ COUNTY

August—The property recently purchased by William Kemp is shipping a car a day to Globe.

California

BUTTE COUNTY

Magalia Ridge—Los Angeles men have become interested in this property on the Cape Horn channel, Magalia ridge, and operations on a large scale will be started. An air compressor and machine drills have been installed. Manager, E. D. Casterline.

Hurleton—Around this place there is a revival in mining. The creeks around Evansville and Natchez were rich in placer gold.

CALAVERAS COUNTY

Lightner—The closing down of this productive mine owing to the bad condition of the shaft is a blow to Angels. A new shaft will be sunk.

EL DORADO COUNTY

Boulder Extension—In the east extension of the Boulder mine, Rescue, Belmont Blair and Edward Kipp have found a rich vein of ore, richer than that in the original mine. Machinery will be put on.

Alliance—The company has transferred its business from San Jose to Modesto. The gravel mine near Placerville has been prospected by drills. A tunnel is being driven to drain the channel.

HUMBOLDT COUNTY

Salmon Summit—Work is in progress and a portable stamp mill is being installed by Frank Smith and associates of Arcata.

MADERA COUNTY

Fresno Flats—There is excitement about gold veins in this section but thus far there has been no production.

MODOC COUNTY

Hoag District—The new mill being set up for custom work is a Lane with a capacity of 50 tons daily.

NEVADA COUNTY

Fairview—Work is progressing on the 20-stamp mill, C. M. Wilson, manager. A full force is underground.

Amador Consolidated—As soon as the road is finished to Forest Springs, four miles from Grass Valley, work is to begin. A stamp mill has been purchased.

Pittsburg—At this property, Nevada City, Mark B. Kerr, manager, three shifts of men have been set at work regularly and the mill has been started up on ore from the 700- and 800-ft. levels.

Eagle Bird—Machinery at this mine at Washington, injured in the recent fire, will be put in order again, including the hoist and air compressor.

Gold Mound—The mine at Deadman's Flat has been placed under bond to E. I. Field, of Telluride, Colo., who will soon begin work. Electric power will be used and the plant will be enlarged.

Yellow Metal—Alexander McMillan, owner of the mine at Bowman's dam, is

selecting a mill-site for the 10-stamp mill to be erected.

SHASTA COUNTY

Mad Ox—The mine, Whiskeyton, is being reopened by H. L. Burkey, of Nevada. Extensive developments are planned.

Mammoth Copper Company—This company at Kennet has resumed the operation of briquetting the flue dust. The 20,000 ton capacity bins for sulphide ore will shortly be finished.

SIERRA COUNTY

Scales Diggings—The rebuilding of the Brandy City head dam has done much to bring this section again into prominence and many men are at work thereabouts.

SISKIYOU COUNTY

Mono—The mine at Punch Creek Humbug district has 25 men at work under J. T. P. Porter. The company has a 4-stamp mill and cyanide plant.

Colorado

Colorado Fuel and Iron Company—The annual report for fiscal year shows gross earnings $20,344,630 against last year $22,099,880. Net earnings rose to $2,901,011 from $2,553,367 due to decrease in operating expenses.

CHAFFEE COUNTY

Grant Eclipse Consolidated Mines Company—The company has been formed to unite the Little Giant and Eclipse properties, Monarch district, near Salida.

DOLORES COUNTY

United Rico—The wet concentration mill is in shape for tests of the lead-zinc ore. The company is developing extensively.

EAGLE COUNTY

East Lake Mining and Milling Company—The tunnel in Mt. of the Holy Cross district is in 2200 ft., and has cut a 4-ft. gold vein. The objective point is the Washington vein 200 ft. in advance. The present depth at breast 1800 ft. The tunnel is at timber line.

FREMONT COUNTY

Rocky Mountain Smeltery—The property at Florence is sold under mortgage to the Iowa Fiduciary Company for $80,517.

GUNNISON COUNTY

Royal Oak—An important strike of lead ore has been made on this property at Bowerman owned by the Tin Cup company. Other mines on the district are developing actively and there is a movement for railroad connection.

LAKE COUNTY—LEADVILLE

Progressive—Work is again resumed to open the orebody from the bottom of the shaft.

St. Louis Tunnel—Several carloads had been shipped from the low-grade orebody recently opened in the tunnel.

Ibex—Four shafts are working and about 7000 tons a month being shipped.

OURAY COUNTY

Thistledown—An important strike was made on this property.

San Antonio—High-grade mineral ore has been discovered on this property by the prospectors.

TELLER COUNTY—CRIPPLE CREEK

Cripple Creek—The September output was 63,150 tons of the gross value of $1,297,440. The average value of the ores marketed was $20.50. The Gold Issue mill on Carbonate hill is represented for the first time in the output. The tonnage was distributed as follows:

Plant.	Tons.	Av. Val.	Gross Val.
Golden Cycle	25,200	$20.00	$ 509,040
U. S. R. & R.	12,500	22.00	275,000
Portland	10,000	20.00	200,000
Smelter	4,200	65.00	273,000
Stratton Indepnd., est.	5,000	4.50	22,500
Isabella	3,000	2.00	6,000
Wild Horse	1,150	4.00	4,600
Gaylord	1,100	3.00	3,300
Gold Issue	1,000	4.00	4,000
Totals	63,150	.....	$1,297,440

Free Coinage—The main shaft at Pinto mine will be sunk from 740 ft. to 800 feet.

Raven and Beacon Hill—The Worcester ventilation is being installed at 500 ft., where the characteristic foul gases prevented further work.

Gold Sovereign—New plant has been accepted and work by Clements Leasing Company will be started at once.

El Paso—An aërial train is being built from ore house up to the railroad spur.

Cresson—A daily output of 100 tons is maintained and the reserves increased.

Vindicator Consolidated—Five ore-bearing veins have been opened up at 1300-ft. level of No. 1 shaft. Work to cut them at 1400 ft. is under way.

Ida May—An oreshoot has been opened at shallow depth in a basalt dike and shipments are being made.

Idaho

BONNER COUNTY

Swastika Mining and Development Company—The company has purchased the silver-lead mines near Lakeview on the Cœur d'Alene divide. A 3000-ft. tunnel will be driven to cut the veins at 2000 ft. J. W. Ferguson, manager.

SHOSHONE COUNTY

Bunker Hill & Sullivan—Dividend No. 145, of $45,000, has been paid. The total dividends since Jan. 1, 1909, is $525,000, and total to date, $11,196,000.

Indiana

BLACKFORD COUNTY

There is renewed activity in oil drilling in this field, and during the past week seven new wells were completed with an aggregate production of 316 bbl. per day. Only two dry wells were found.

PIKE COUNTY

In southwestern Indiana, in the Oakland City oilfield, two 300-lb. gushers were brought in Oct. 1. These two wells are to the south edge of the field, and indicate its southern extension, with prospects of the productive area continuing across the Ohio river.

VANDERBURG COUNTY

By the explosion of an alleged illegal shot in the Moore-Gibson coal shaft Oct. 1, several miners were seriously injured. James Clemens, who fired the shot, was immediately arrested by Deputy Mine Inspector Same but was only fined $1 and costs.

Kansas

CHEROKEE COUNTY

DeGraff Bros.—On the 160-acre fee at Badger, a run of zinc ore has been found at 110 ft. Drill prospect work has been in progress three years on this and an adjoining tract and $30,000 has been spent.

Emma Gordon—Charles Theurer has taken a lease on the tailings south of Baxter Springs and is remilling the waste. A complete mill was erected. The Old Chief tailing pile is also being reworked and this is the first work of the kind. Owing to the ore carried away by oil in the formation, the remilling will be profitable.

Baxter Springs District—Practically every mining plant in this district is now either in operation or ready to be started.

Kentucky

JOHNSON COUNTY

Consolidation Coal Company—Work is progressing well on the development of the large tract of coal land owned by this company near Paintsville. The company will expend about $3,000,000 for its initial mining plant, including town, two power plants of 600-kw. capacity, standard-gage railroad, steel bridge over Big Sandy river 400 ft. long, with concrete piers and other facilities. The new town will be called Van Lear, and 400 dwellings are already under construction. The company will erect its own water works. Jonathan Jenkins, formerly of Frostburg, Md., has charge of the mines and their development.

Michigan

COPPER

Hancock—The winze on No. 3 lode is down below the 16th level and from that point a drift has been started on the formation. This winze is sinking from the 13th level, the bottom of No. 1 shaft

in a good grade of copper ground the drifts from 13th, 14th and 15th levels are being extended in the same round. The No. 2 shaft, vertical to the lodes is near the 2000 ft. at which point it is estimated the lodes will be cut.

Keweenaw—Work has been discontinued on the Medora shaft and attention will be centered on the Kearsarge lode on which two shafts have been started.

Indiana—The drill in the eastern portion has reached the ledge.

Lake—The crosscut from the 5th level is in 100 ft. without exposing the lode, and it is now apparent that it is steeper than the formation.

Victoria—Drill work has stopped; all attention is given to the main workings with the result that a much better showing is being made and the company is about meeting expenses.

IRON

Newport—Recently during two shifts of ten hours 4005 tons was raised from the "D" shaft at Ironwood, a distance of 2200 ft. This is claimed to be a hoisting record.

Northwestern Ore Dock—The new dock to replace the collapsed No. 5 dock, at Escanaba, will have 400 pockets and will be 2400 ft. long. This will make it the largest dock on the lakes.

WAYNE COUNTY

Detroit Salt Company—The first shipment of salt has been made from the shaft at Oakwood. This shaft is 16x6 ft. and 935 ft. deep.

Minnesota

IRON—MESABI

Perkins—The mine shipped its first ore Sept. 4, and is shipping daily 2500 tons, and expects to ship 100,000 tons before the close of navigation. The stripping and loading of ore is done under contract by MacArthur Brothers Company, Chicago.

Hudson—This new mine in section 4, 58-15,, is being opened by Pickands-Mather & Co. It will be an open-pit mine and a stripping contract has been let to the MacArthur Company for the removal of 650,000 yards of overburden. Two steam shovels are in operation. No ore will be mined this year.

Hector—The property formerly owned by George H. St. Clair, is being unwatered by the Inter-State Iron Company, which has a lease. It will require about a month to unwater the mine, when it will be worked to its full capacity.

Monica—The mine is shipping a small amount of ore daily and expects to ship 10,000 tons this season. It is a new mine and considerable amount of development work must be done before a large shipment is expected.

Missouri

ZINC-LEAD DISTRICT

Ground & Irwin—The 80-acre tract at Porto Rico has been sold for $80,000.

Quick Seven Mining Company—The company, at Neck City, has been incorporated for $105,000 to operate a new lease.

Granby—P. H. Crossman has made a very rich strike of silicate west of Granby.

Spring City—F. H. Todd of Webb City has secured a 34-acre tract at Spring City. The drilling shows the same run of ore that has been developed at the same level all over the camp.

Galena-Kansas—The Waterhouse mill on the Maggie Taylor land is nearly completed. This mill has a capacity of 200 tons a shift.

Montana

BROADWATER COUNTY

Horn—The shaft is down 70 ft. and shipping will soon begin. Charles D. Horton, Redersburg, is in charge.

Keating—The company is to make improvements which will cost $125,000. The Blacker shaft will be sunk an additional 300 ft. and a new hoist be installed which will double the present capacity.

DEER LODGE

Montana Mine Exploration Company—The company has acquired a gold property on Lost creek. The shaft is only 45 ft. deep, and $10,000 of ore has been taken out.

FERGUS COUNTY

Barnes-King—A cave on the 400-ft. level last week necessitated a temporary suspension.

GALLATIN COUNTY

Gallatin Valley Electric Railway—The road from Bozeman to Salesville has been completed. This is the first electric railway of any length in the State.

LEWIS & CLARK

Missouri River Power Company—About 600 men are employed in rebuilding the Hauser lake and Wolf creek dams. The flume at Hauser lake to carry the river around the dam is ⅓ mile long, 50 ft. wide and from 10 to 23 ft. in hight. Its capacity is 80,000 gallons per second.

Nevada

ESMERALDA COUNTY

Oriole Mining Company—The company has bought a mill for its free-gold mine at Mina. Work on foundations has begun.

NYE COUNTY

Tonopah—The quarterly dividend of 25c. next to dividend of 10c. just declared brings the total dividend disbursements up to $5,200,000.

STOREY COUNTY

Ward—It will take 6 to 8 months to get the shaft in proper condition for work. There has been raised $500,000 through assessments for the work of the Ward shaft, which is now at a depth of 3000 ft. This will drain the Gold Hill mines and will releive the pressure on the pumps now draining the Consolidated Virginia, Ophir, Mexican and other mines of Virginia City.

Sutro Tunnel—In five years $100,000 have been spent in repairs on this tunnel, and $200,000 in prospecting the Comstock mines connected with it. It is reported that at present only one mine, the Ophir, has reached a stage of paying expenses.

Consolidated Virginia—The Reidler pumps installed on the 2100-ft. level are pumping 40,000 gal. of water a minute and are holding back the water successfully for the time.

WHITE PINE COUNTY—ELY

Nevada Consolidated—The company is now producing at the rate of over 60,000,000 lb. of copper per year at a cost of about 7c. per lb. Dividend action is looked for soon as no further construction is now planned beyond that already in hand. Five steam shovels are operating at the property and at the Steptoe reduction works the fourth reverberatory was put in commission on Sept. 27, and the fifth is to be completed on Dec. 1. The blast furnace to handle miscellaneous cleanings and coarse material is to be ready on Oct. 30. The fifth converter stand and a Nordberg blowing engine for this department are to be completed on Jan. 15, at which date it is expected that the construction account will be closed, and operating profits will go into the company treasury. Nothing will be done this year toward the construction of the fifth section of the concentrator, this work having been postponed indefinitely.

Cumberland-Ely—It is authoritatively stated that the Veteran shaft is in good working condition and that a new shaft will not be sunk when operations are resumed at this property. The caving system has been employed in the mine, but not near enough to cause injury to the Veteran shaft, which is in practically as good condition as when the mine closed on July 1, as a result of labor troubles.

Giroux Consolidated—The development of the new Giroux shaft is being pushed to determine the character and extent of the direct smelting ore, tonnage estimates of which are not yet made public by the company. The type and size of smelter have not yet been determined. The company has its concentrating plant at Kimberley. Funds are reported in the treasury to equip and develop the mine.

Steptoe Smeltery—The September output is estimated at 5,000,000 lb. of copper.

New Jersey

WARREN COUNTY

The first shipment of copper ore from the old mines at Pahaquarry, recently reopened, was made last week. It included a carload of sorted ore and was sent to New York to be tested. There is no railroad connection with the mine, and the ore had to be teamed about 12 miles.

New Mexico

LINCOLN COUNTY

Parsons Mining Company—This company, of Mishawaka, Ind., will not undertake work on the Eagle mine at Parsons before spring.

SOCORRO COUNTY

United States Treasury—A bonanza strike has been made by the new operators. The same orebody has also been exposed in the White Eagle shaft. The ore is high in gold. There is considerable activity in the camp which is near Chloride.

Germany Mining and Development Company—Properties near Kelly in the Magdalena district have been sold to the company. The ores contain lead, zinc and silver. The company reports $250,000 for development.

Ohio

Card & Prosser Coal Company—The Burnitt farm just north of Lisbon has been leased by this company. A new shaft will be started on the property at once to take the place of the old West Pittsburg shaft.

Pennsylvania

Banning Connellsville Coke Company—Contracts are to be let at once for the building of 100 coke ovens near Banning, in the Lower Connellsville district. Enoch Abraham, of Connellsville, is president.

Gates Coal and Coke Company—This company has bought 234 acres of land on the Waynesburg coal seam in the Klondike field, near Masontown. The price was $250,000 for the coal rights and 40 acres of surface land for the plant.

South Dakota

BLACK HILLS DISTRICT

Ama Queen—The property at Custer Peak will be unwatered, and this shaft deepened.

Montezuma—Diamond drill explorations are being made on this property at Rochfort.

Utah

BEAVER COUNTY

Harrington-Hickory—The Majestic company mine has commenced the shipment of silver-lead ore. The electric installation is completed and the machinery ready for operation.

Western Mining and Leasing Company—The company has been organized to hold the Comet group in the San Francisco district. The negotiations are supposed to be in the interests of the Newhouse company.

CARBON COUNTY

Consolidated Fuel Company—A new mine will soon be opened at Miller Creek. The mine is planned and equipped for an output of 2000 tons per day. A new town, called Hiawatha, has been built for the accommodation of the miners. Shipments will begin in November. Rail connection is with the Utah Southern.

JUAB COUNTY

Colorado—President Jesse Knight reports that a strong fissure has been found below the ore bed.

Centennial-Eureka—The tunnel to tap the shaft is now in 100 ft. Work is being carried on at both ends, and it is expected that it will be continued at the rate of 400 ft. a month, completing the project in eight months.

Uncle Sam—Both ore reserve and shipments have been increased recently.

Tintic Smeltery—The fires were drawn Sept. 29. As a result of the closing of the smeltery the Dragon mine, which furnished the flux, is also closed.

Gemini—According to Superintendent J. H. McChrystal, the pumps are handling the water without difficulty and work will not be suspended in the lower level as reported.

Sioux Consolidated—The improvement of the ore at 450-ft. level is reported by Manager C. E. Loose.

SALT LAKE COUNTY

Utah Consolidated—The tramway to connect Bingham with smeltery at Tooele will be complete by Jan. 1. Work is now being done upon the superstructure.

Emma Copper Company—All outstanding debts have been paid and the directors have authorized the resumption of work on the property at Alta, W. W. Wantland, manager.

Columbus Consolidated—On the 400-ft. level an orebody was found in new ground.

SUMMIT COUNTY

American Flag—The shaft at Park City is down 1135 ft. and the lower levels drained.

Silver King Consolidated—On the 1600-ft. level the orebody on the contact vein is being explored east and west. It apparently extends into the lime.

Virginia

FLOYD COUNTY

Brinton Arsenic Mines Corporation—This company has been incorporated with a capital stock of $100,000 to develop arsenic properties. Its officers are: Caleb R. Brinton of Brinton, president; R. B. Brinton of Richmond, vice-president; Jacob S. Coxey of Massillon, O., secretary-treasurer. Arsenic from the Brinton mines will be utilized for manufacturing paris green at Norfolk in a plant to be built by the Dominion Chemical Company, of Norfolk. Operations at Brinton were started some five years ago by the United States Arsenic Mines Company, of Pittsburg, Penn., but have been suspended for over two years past.

Washington

FERRY COUNTY

Kettle River Mining Company—A concentrator will be installed.

Rio Tinto-Treadwell—A contract for a 400-ft. tunnel has been let. G. B. Dennis, Curlew, manager.

SNOHOMISH COUNTY

Imperial—The owners are arranging for the construction of a concentrator and arsenic plant with a daily capacity of 300 tons.

National Milling and Mining Company—The suit against James Piccolo to recover title in the Silver Creek Mining district has been won by the company.

Good Hope—The mine at Silver Creek is shipping two cars of ore from the Evening Star to the Tacoma smeltery. The property has 1000 ft. of development.

CHELAN COUNTY

Holden Gold and Copper Mining Company—Work is progressing rapidly in all of the tunnels.

West Virginia

Parkesburg Zinc Company—The plant at Northview, near Clarksburg, has been sold to E. P. Pearlman, of Philadelphia, lessee, for $42,000.

RALEIGH COUNTY

Milburn Coal and Coke Company—This company has been organized to develop a large tract of coal land, and arrangements have been made to begin work at once. R. M. Lucas, of Columbus, O., is at the head of the company.

Canada

BRITISH COLUMBIA

British Columbia Copper Company—The third furnace is in commission. Work will be started shortly on a fourth furnace to provide capacity for the ores from the New Dominion company.

Consolidated—The annual production of gold for the year ending June 30, 1909, was 114,920 oz.; silver, 2,443,475 oz.; copper, 4,637,631 lb.; lead, 43,675,077 lb. The total value was $5,505,526. The number of tons smelted for the year was: Lead furnaces, 61,398, and for copper furnaces,

313,069; total, 374,467 tons. Smeltery is at Trail. W. H. Aldridge, managing director.

ONTARIO-COLBALT

Little Nipissing—A new discovery of high-grade ore under Peterson lake has been made.

Shamrock—In the workings north of the shaft at the 200-ft. level smaltite ore carrying native silver has been discovered.

Temiskaming & Hudson Bay—Drifting and crosscutting on all four levels have resulted in additional good showings. On the 200-ft. level, close to the Nipissing corner, a winze is being put down for an additional 50 ft., where drifting will be again started. Should high silver contents be maintained a new main shaft will be put down.

Bailey—Foundation work has been started for the new compressor house. The compressor will have a capacity of five drills to be driven by electricity by one of the companies on Montreal river.

Red Jacket—An important stake has been made on this property indicating an extension of the silver-producing area. The company has spent $35,000 in development. The main shaft is sunk on a calcite vein, and at a depth of 125 ft. rich ore shot with native silver was encountered and the vein had widened to 35 inches.

Silver Cross—The equipment of the mine has been greatly improved latterly, and No. 2 shaft is being put down to the 200-ft. level on a calcite and smaltite vein, the silver contents of which are increasing with depth.

Beaver—The vein struck at the 200-ft. level, from which about half a car of high-grade ore was taken, was encountered again at 250 ft. after a winze had been sunk for 50 ft. After stoping out enough ore to complete a car of high-grade the vein will be followed.

Ore Shipments—Shipments of ore from Cobalt camp for the week ending Sept. 25 were as follows: Buffalo, 57,110 lb.; Cobalt Central, 40,610; Cobalt Lake, 61,380; Coniagas, 62,530; Crown Reserve, 187,300; Kerr Lake, 62,020; La Rose, 195,010; McKinley-Darragh, 86,140; Nancy Helen, 41,300; Nipissing, 62,430; Right of Way, 117,950; Silver Cliff, 60,000; total, 1,033,780 pounds.

Mexico

CHIHUAHUA

Yoquivo—The new mill is arranged so that no slimes are elevated except in filtering. Overstrom tables serve as classifiers for feeding the tube-mill cone. The tube mill is equipped with ribbed liners, two man holes, spiral feeder and special end-liner shapes which permit feeding pebbles to the mill while in operation. Air agitation and vacuum filtration are provided. The mill is being built.

The Batipolis Mining, Smelting and Refining Company, Ltd.—The company has been organized in London with a capital of £300,000 to hold the controlling shares in the American company which owns the extensive property in western Chihuahua. The new company announces an extensive program of exploration and development.

Candemania—Examination of this mine, near Ocampo, is being made in the interests of a New York company.

Corona Consolidated Mining Company—The company has been incorporated as successor to the Porvenir Mining Company at Parral. Nat P. Wilson, manager. A mill will be erected.

DURANGO

San Fernando—J. T. Canfield and associates have struck good ore in this mine in the Topia district. It was at one time extensively explored by T. L. Livermore, of Boston, presumably for the Calumet & Arizona company and was abandoned.

GUERRERO

Suriana—A copper-lead smelter has been shipped from El Paso to this property, near Balsas. J. Gordon Hardy, engineer.

HIDALGO

Doña Phoebe—W. C. Bronson is planning development on this property, located in the unproven gap between the La-Blanca vein and the Pachuca veins.

Blaisdell-Coscotitlan—The syndicate, treating the old tailings of the Pachuca district, has completed the enlargement of its plant and will be soon handling from 700 to 800 tons daily.

JALISCO

Virginia & Mexico—The new mill is treating only 50 tons per day owing to fuel difficulty.

El Favor—The annual report shows development of 7846 ft. Ore shipped net, $51,985. A 20-stamp plant and cyanide annex is being erected.

OAXACA

Los Ocotes—The Teziutlan company is making arrangements to resume shipments. For several months exploration and development work have been carried on.

SONORA

Cieneguita—Concentrating mill and one reverberatory furnace will be started on ore taken out in development.

Guanajuato—Governor's annual message reports that the district's production for 1908-1909 was 8,077,019 pesos, on which the direct tax was 121,155 pesos. This is equal to the record output of 1850, the highest in the century.

Promontorio—The option to the Clark Copper Company has expired and has not been renewed. The mine is at Alamos.

Africa

TRANSVAAL

The production of ores, other than gold, in the Transvaal for the seven months ended July 31 was: Copper ore, 2184 tons; tin ore, 1365 tons; lead ore, 1278 tons. Production of other minerals was valued at £14,554 for flint; £39,950 for lime; £1031 for magnesite; £9061 for asbestos, graphite and minor products.

RHODESIA

Gold production in August was 54,253 oz. fine, making a total of 408,211 oz. for the eight months ended Aug. 31. Last year the reports were made in bullion; this year they are in fine gold. A comparison by values shows, for the eight months, $8,330,736 in 1908, and $8,361,576 in 1909; an increase of $30,820 this year.

Asia

INDIA—MYSORE

Kolar Goldfield—Gold production reported in August was 45,173 oz. bullion. For the eight months ended Aug. 31, it was 348,834 oz. in 1908, and 354,556 oz. in 1909; an increase of 5722 oz. The bullion reported this year was equal to $6,595,797, or 319,100 oz. fine gold.

Central America

SALVADOR

Santa Ana—A 5-stamp mill and tube mill and cyanide plant will be installed on the property of Sres. Gonzales and Vides near Santa Ana. The ore is gold and soft.

New Caledonia

Shipments of minerals from the colony for the six months ended June 30 are reported by the *Bulletin du Commerce* of Noumea as follows: Nickel ore, 23,843 metric tons; cobalt ore, 414; copper ore, 7; iron ore, 10; chrome ore, 9644 tons.

South America

BRITISH GUIANA

Exports of gold from British Guiana for the eight months ended Aug. 31 were 42,163 oz. bullion in 1908, and 41,280 oz. in 1909; a decrease of 883 oz. The bullion exported this year was equal to $716,242, or 34,652 oz. fine gold. Exports of diamonds were 3112 carats, valued at $20,354; an increase of 442 carats over last year.

Turkey

Arghana Copper Mines—The state department at Washington has received notice that the Turkish government will consider bids for the concession for these properties. American companies are interested in the bidding.

Metal, Mineral, Coal and Stock Markets

Current Prices, Market Conditions and Commercial Statistics of the Metals, Minerals and Mining Stocks

QUOTATIONS FROM IMPORTANT CENTERS

Coal Trade Review

New York, Oct. 6—The Seaboard bituminous trade is improving and the markets show a better tone. Orders are coming in more freely, especially from New England territory, where the manufacturers are beginning to lay in their winter supplies and are taking coal on a larger scale than they have done for some time past. Some car shortage is beginning to develop, for the first time in two years, and the railroads are not moving coal as promptly as they have been. The effect of West Virginia competition is still being felt and has prevented any rise in prices, notwithstanding the increase in business.

The anthracite trade is steady and quiet, without any special incident. Shipments of anthracite to the West are increasing and it looks as if that section would take about its usual proportion of hard coal.

In the West reports from the principal centers are favorable, and business continues to improve. The exception is found in the Lake trade which is still rather slow. There are signs, however, that the present month will see a heavy shipment to the Northwest.

Agitation continues in the Pittsburg and Eastern Ohio districts over the alleged inequality of rates from various districts to Lake Erie ports.

The proposed merger of independent coke interests in the Connellsville region appears to have fallen through, and the options taken on a number of properties are being allowed to lapse. Lack of money to finance the merger is the probable cause of the failure.

Coal Traffic Notes

Coal and coke tonnages originating on Pennsylvania railroad lines east of Pittsburg and Erie, year from Jan. 1 to Sept. 25, short tons:

	1908.	1909.	Changes.
Anthracite	3,728,132	3,496,008	D. 232,124
Bituminous	24,120,590	26,667,834	I. 2,547,244
Coke	5,035,728	7,826,990	I. 2,791,262
Total	32,884,450	37,990,832	I. 5,106,382

The total increase this year to date was 15.5 per cent.

Coal receipts at St. Louis, seven months ended July 31, were 3,573,083 short tons in 1908, and 3,582,624 in 1909; increase, 9541 tons.

Receipts of domestic coal at San Francisco, seven months ended July 31, were 280,482 short tons in 1908, and 166,391 in 1909; decrease, 114,091 tons.

Shipments of coal from Seattle and Tacoma, Wash., seven months ended July 31, were 347,799 tons in 1908, and 192,607 in 1909; decrease, 154,192 tons. The shipments are to California and Alaska ports.

Coal passing Davis Island dam on the Ohio river, seven months ended July 31, was 1,615,965 short tons in 1908, and 2,354,070 in 1909; increase, 738,105 tons.

Coal passing through the locks on the Monongahela river, seven months ended July 31, was 4,839,100 short tons in 1908, and 5,494,720 in 1909; increase, 655,620 tons.

Bituminous coal and coke shipments, Pennsylvania and West Virginia, seven months ended July 31, short tons:

	Coal.	Coke.	Total.
Balt. & Ohio	12,239,933	2,450,710	14,690,643
Buff., Roch. & Pitts.	3,531,033	269,083	3,800,116
Buff. & Susqueh'na	812,811	190,680	1,003,491
Penn. lines, N. Y. C.	3,996,137	54,820	4,050,957
Pitts. & L. Erie	4,886,023	2,725,125	7,611,148
Norfolk & Western	7,446,616	1,402,204	8,848,820
Ches. & Ohio	7,279,971	265,272	7,545,243
Total	40,192,524	7,357,894	47,550,418
Total, 1908	34,651,139	4,560,430	39,211,559

Total increase this year, 8,338,859 tons, or 21.3 per cent. In addition to the above, the Baltimore & Ohio carried 440,584 tons anthracite in 1908, and 455,745 in 1909; increase, 15,161 tons.

Coal tonnage of railroads in Ohio Coal Traffic Association, seven months ended July 31, short tons:

	1908.	1909.	Changes.
Hocking Valley	1,444,791	1,525,042	I. 80,251
Toledo & Ohio Cent.	695,578	657,046	D. 38,532
Baltimore & Ohio	771,191	752,224	D. 18,967
Wheeling & L. Erie	1,489,099	1,670,910	I. 181,811
Cleve., Lorain & Wh.	1,352,969	1,274,280	D. 78,689
Zanesville & Western	613,514	582,094	D. 31,420
Toledo Div., Pen. Co.	863,911	970,097	I. 106,186
L. Erie, Alliance & Wh.	517,868	541,508	I. 23,640
Marietta, Col. & Clev.	26,332	43,208	I. 16,876
Wabash-Pitts. Term.	.....	11,608	I. 11,608
Total	7,775,253	8,028,017	I. 252,764

The total increase in tonnage this year was 3.3 per cent. Only the Ohio lines of the Baltimore & Ohio are included above; the main line is given elsewhere.

Coastwise shipments of coal from chief Atlantic ports, seven months ended July 31, long tons:

	Anthracite.	Bitum.	Total.	PerCt.
New York	8,578,430	5,962,152	14,540,582	62 0
Philadelphia	1,193,559	2,576,600	3,770,159	16 1
Baltimore	138,099	1,944,006	2,082,105	8 9
Newp't News	.....	1,929,710	1,929,710	8 2
Norfolk	.....	1,135,053	1,135,053	4 8
Total	9,910,088	13,547,521	23,457,609	100 0
Total, 1908	10,343,489	12,827,249	23,170,738	. . .

Total increase this year, 286,871 tons, or 1.2 per cent. New York includes all the New York harbor shipping points.

New York

Anthracite

Oct. 6—The anthracite market shows no special change, and little increase in business. There seems to be no disposition to lay in stocks yet, and sales are limited to the usual current trade.

Schedule prices for large sizes are unchanged at $4.75 for lump and $5 for egg, stove and chestnut, all f.o.b. New York harbor. For steam sizes quotations are: Pea, $3.10@3.25; buckwheat, $2.25@2.50; No. 2 buckwheat or rice, $1.75@2; barley, $1.35@1.50; all f.o.b. New York harbor. Some individual and washery coal can be had at about 10c. below quoted prices.

Bituminous

The general tone of the market is better, and there is more inquiry for coal, but no improvement in prices. The feature of the trade is the development of some shortage in cars. The resulting fact that buyers cannot get their coal as promptly as they have been doing has hurried up some, who are now seeking to put in stocks ahead, instead of buying only as they needed the coal. The shoal-water ports are also beginning to hustle for winter supplies, which has helped to improve trade. The Sound ports are also waking up, and are taking more coal. New York harbor trade is coming in rather irregularly.

Prices remain about the same as they have been for several months. Contract deliveries are being called for more freely.

Car supply, as above stated, is not good, and there is difficulty in getting cars enough, for the first time in two years. Transportation is irregular on nearly all the railroads, and cars take several days over schedule time to get to tidewter.

The coastwise vessel market is still overcrowded; agents and skippers are hunting for cargoes, and are willing to take them at the current low rates. New York harbor quotes on small vessels 50c. around the Cape, with 5 to 15c. higher to special points. Philadelphia quotes on large vessels 60@65c. to Boston, Salem and Portland, 65@70c. to Portsmouth, 70@75c. to Lynn, and 75@80c. to Newburyport.

Birmingham

Oct. 4—Coal operations in Alabama continue to improve. There is yet some room for a better demand in steam coal, but in the other grades the conditions are quite prosperous. The output at the mines is increasing right along. There is a little scarcity of labor reported, as additional mines are put to work again. A large number of white miners left this district

during the depression and while word has been sent to many of them, they are slow in returning. The furnace companies reported last week that they were forced to withdraw from the open market on coal, the furnaces and coke ovens requiring all their coal. The coke situation is strengthening and the best output possible is being sought. The erection of a number of by-product coke ovens to use coal from the Yolande mines is proposed, the plant to be located in the vicinity of Bessemer, and about 12 miles from Birmingham. The Tennessee Coal, Iron and Railroad has its plans drawn for the construction of by-product ovens in the vicinity of Ensley and Wylam, 6 and 10 miles from Birmingham.

Chicago

Oct. 4—The coal market continues strong. Sales of nearly every kind of bituminous, steam and domestic, are large, and anthracite sales are increasing at a rate very satisfactory to dealers. Fine coals from Illinois and Indiana mines are weak and not likely to strengthen, for the market is now well converted to its post-summer schedule. The expected overshipment of some kinds of coal has occurred; Illinois screenings generally are 5 or 10c. off on forced sales to escape demurrage, and some lump from the same mines has been sold at slightly reduced prices for the same cause, while smokeless exhibits something of its old-time wobbly tendency, with both lump and run-of-mine occasionally sold at cut prices to escape railroad charges for delay. These cases point to the need of caution in sending coal to the Chicago market, notwithstanding the large and increasing sales. It is a market that is easily flooded when producers divert to it any unusual amount of coal.

Illinois and Indiana coals bring, for lump, $1.75@2.50; run-of-mine, $1.65@1.75; screenings, $1.10@1.40. Hocking, at an advanced price of $3.15, is in good demand. Smokeless also finds good sale at $3.45@3.55 for lump, and $2.95@3.05 for run-of-mine. Gas coals are quiet. Youghiogheny ¾-in. bringing $3.15 per ton.

Cleveland

Oct. 5—The demand for steam coal is good, and sales have been large. Some large contracts for Pocahontas are reported. Operators are inclined to ask higher prices on long contracts. The trade in domestic coal is improving.

Prices are firm, but have not advanced. The current quotations on Ohio steam coals are: No. 8 district lump, $1.90@2.05; run-of-mine, $1.70@1.80; slack, $1.35; Middle district 5c. lower on all kinds; Massillon domestic coal is $2.95 for washed lump. Pittsburg coal is $2.10@2.25 for lump; $2@2.05 for run-of-mine; $1.35@1.45 for slack. Pocahontas brings $3.05 for lump and $2.35 for run-of-mine.

Indianapolis

Oct. 5—Steam coal continues in good demand, and dealers in domestic coals are still putting in stocks, so that business is looking well all around. Mines are working better time for the most part.

Interest just now centers in the meeting of the United Mine Workers. Several questions have come up for consideration, the most important being the explosives difficulty in the Pittsburg district.

Pittsburg

Oct. 5—Demand for coal from manufacturers and retail dealers has continued to show an increase, while Lake shipments are fairly heavy. The improvement has not affected prices favorably, and they are still shaded. While mine-run is fairly steady to retail dealers at $1.10, sales to manufacturers are made at $1.05 in some cases but frequently at $1. Slack on attractive orders is selling at 55@60c. Labor is somewhat scarce and many of the large operators could employ additional miners.

Connellsville Coke—The market continues excited, and operators are imbued with the idea that the recent advance will not only hold, but will be followed by others. Many operators are staying out of the market entirely for next year, although the prevailing range on furnace coke is $3 for first half and $2.90 for the entire year. Various summaries are being made by coke interests, the showing invariably being that the increase in blast-furnace capacity already experienced since 1907, and that in prospect by the early part of next year, decidedly exceeds the increase in coking capacity. The view of buyers, however, is that most of the increased demand has been experienced already, and that when running, in the past month, about 33,000 ovens out of a theoretical total of 38,500 the coke industry has met the demand fairly well, while with additional labor between 3000 and 4000 ovens could be added to the active list. The labor supply increases very slowly, but there is every prospect of a general wage advance Jan. 1 or earlier. The present scale is based on a mining rate of $1.20 per 100 bu., which compares with $1.35 paid from Jan. 1, 1903, to Dec. 16, 1903, and again from March 1, 1907, to Jan. 1, 1908.

A curious feature is that foundry coke does not show a spread above furnace coke for next year, while in the past fortnight prompt lots of foundry have sold at less than similar lots of furnace. We quote the market as follows: Prompt and fourth-quarter furnace, $2.75@3; 72-hour foundry, $2.50@3. For 1910, furnace coke, $3 for first half, $2.90 for all year; 72-hour foundry, $3@3.25, for the year.

The *Courier* reports the production in the Connellsville regions in the week ending Sept. 25 at 418,956 tons, a decrease of 8000 tons from the previous week; shipments at 4949 cars to Pittsburg, 7510 cars to points west of Pittsburg and 891 cars to points east of Connellsville, a total of 13,350 cars.

St. Louis

Oct. 4—With the advent of October the coal market is back to a semblance of the rush times of 1906 and 1907. Dealers are taking all the high-grade coal they can get. Prices are not so much of an object as heretofore; the question now is to get the coal. Dealers are complaining that when they order 10 cars they get two. As the weather has been warm and balmy up to date a heavy rush is anticipated with the first cold weather.

Standard and lower-grade coal is moving freely, though the supply is plentiful. Prices on the lower grades are a little stiffer than last week, though the change is not so marked as it is in the higher grades. The screening market is still easing off and has reached a point where Standard screenings are hard to move at 10c. per ton f.o.b. mine. It is expected that they will be going begging for the freight in another two weeks. Carterville screenings are holding up to about 40c. per ton at the mine. This price has been cut several times to clean up an accumulation of coal on hand.

Steam sizes in nut coal are also lower and Standard 2-in. nut is being offered at 50c. per ton at mine and Carterville at 90c. at mine. Carterville 6-in. lump or egg is bringing from $1.50@1.60 at mine, or $2.17@2.27 f.o.b. St. Louis; 3-in. Carterville nut is quoted at $1.20 at mine, or $1.87 St. Louis. Franklin county coal is offered at $1.75 at mine for 6-in. lump or egg, or $2.52 St. Louis.

Standard coal is being quoted nominally the same as last week, though the general tone of the market is stronger; 6-in. lump is bringing about $1.10 at mine, or $1.62 St.Louis. Staunton, Mt. Olive and Springfield district coals are bringing about $1.30 at mines, or $1.62 St. Louis, while 3-in. lump is going at 5 or 10c. per ton less.

The market on hard coal is very strong and seems to exceed the supply local jobbers are able to obtain; they complain that the mines are getting farther and farther behind on shipments. The situation has changed very much in the last 30 days; a month ago there was a quantity of anthracite up to demurrage, while now nearly everyone is sold up for a month ahead.

Foreign Coal Trade

Transvaal Coal—Coal production in the Transvaal for the seven months ended July 31 is reported from 28 shafts. The total mined was 2,814,385 tons; the total sold and shipped was 2,054,261 tons.

British Coal Exports—Exports of fuel from Great Britain, with coal sent abroad

for the use of steamships in foreign trade, eight months ended Aug. 31, long tons:

	1908.	1909.	Changes.
Coal	41,123,374	41,173,734	I. 50,360
Coke	705,807	721,094	I. 15,287
Briquets	1,039,985	999,515	D. 40,470
Total exports	42,869,166	42,894,343	I. 25,177
Steamer coal	12,803,762	12,930,655	I. 126,893
Total	55,672,928	55,824,998	I. 152,070

The larger exports this year were 6,939,541 tons to France, 6,065,011 to Germany, 6,045,087 to Italy and 2,467,784 tons to Sweden.

German Coal Trade—Exports and imports of fuel in Germany, seven months ended July 31, metric tons:

	Exports.	Imports.	Excess.
Coal	12,615,414	6,502,860	Exp. 6,112,554
Brown coal	18,489	4,738,420	Imp. 4,719,931
Coke	1,897,607	383,859	Exp. 1,513,748
Briquets	888,730	114,449	Exp. 774,281
Total	15,420,240	11,739,588	Exp. 3,680,652
Total, 1908	14,517,108	12,053,008	Exp. 2,464,100

Of the briquets exported this year 257,685 tons were made from brown coal, or lignite. The total coal exported was 12,633,903 tons; imported, 11,241,280; excess of exports, 1,392,623 tons.

Welsh Coal Prices—Messrs. Hull, Blyth & Co., London and Cardiff, report current prices of coal as follows, on Sept. 25: Best Welsh steam, $4.20; seconds, $4.02; thirds, $3.78; dry coals, $3.96; best Monmouthshire, $3.48; seconds, $3.36; best small steam, $2.22; seconds, $1.80. All per long ton, f.o.b. shipping port.

Iron Trade Review

New York, Oct. 6—Activity in the iron and steel markets still continues, although there is a little slackening off from the rush of the closing days of September. This is not enough, however, to give cause for any predictions of a falling market, but is rather the result of the heavy supplies which consumers have obtained for their probable needs.

Sales of foundry pig continue, but are in rather smaller lots than recently. Basic iron is less active, but is still selling in considerable quantities. Prices have remained firm, but have not advanced during the week, and some observers think that they have very nearly reached a turning point. Sales in September were very large, and it is estimated that the orders going to the merchant furnaces during the month were a little over 1,000,000 tons. Orders now accepted are under the conditions that immediate deliveries cannot be made, but buyers must take their turn.

In finished material contracts still continue to be placed. Structural steel is not quite so active, purchases being mainly for smaller lots, although some good-sized contracts are still pending. The greater demand just now is for bridge work. Railroad-material orders are improving, and a good quantity of plates and shapes is being taken by the car builders. Sheets, bars and wire products continue in steady demand.

Rail orders for 1910 delivery continue to come in and the mills will enter the new year with a very good tonnage ahead.

It is understood that basic pig from German furnaces has been offered here at $17.50 per ton on dock at an Atlantic port. It is said that some orders have been placed, but the business is difficult to trace.

Texas Iron Ore—A large tract of iron-ore land in Cass county, Texas, has been acquired by Charles M. Schwab and associates, and is to be connected with the Atchison, Topeka & Santa Fe road by a branch line about 40 miles long. The Texas Railroad Commission has granted the railroad company the right to make a special low rate on ore to Port Bolivar for shipment thence by water.

Baltimore

Oct. 5—Exports for the week included 788,823 lb. tin scrap to Rotterdam. Imports included 4700 tons iron ore from Cuba.

Birmingham

Oct. 4—Pig iron is being sold in this district now right along for immediate or future delivery at $15 per ton, No. 2 foundry. Some of the companies which are now selling for delivery during the first quarter of the coming year are not selling indiscriminately, but are stipulating limited quantities. That the quotations are to go up appears to be the belief of many of the manufacturers in the South. The preparations looking to a decided improvement in the make in this section are being pushed. The iron make should be materially increased during October, as seven furnaces will resume operation during this month. The stocks of iron on furnace yards in this district belonging to the producers are beginning to dwindle rapidly. The iron belonging to brokers and speculators stacked about the furnaces here is moving out slowly but steadily. Some small shipments of iron for foreign countries have been made from the Birmingham district; Costa Rica, for instance, receiving a few hundred tons.

Cast-iron pipe and other interests in this section are all doing well.

Chicago

Oct. 5—Steady buying of moderate amounts of pig iron by melters has marked the last week. The tendency of prices is decidedly upward, although not by sudden jumps. Users of Southern iron are now glad to get it in many instances at $15 Birmingham, or $19.35 Chicago, for No. 2. Some iron is available at $14.50 Birmingham. Northern iron brings $18.50 @19 for No. 2 and is much in demand, being thus lower-priced than Southern, the available local furnace production being more readily disposed of. Buying is for first-half needs mostly, with a sprinkling of belated last-quarter purchases in small amounts and the bulk of the business centering in the first quarter. Confidence in the future is expressed by sellers of pig iron; they look for higher prices and an unchecked volume of sales for an indefinite time. Foundrymen are rapidly enlarging their output and the end, for them, is not in sight. Iron and steel products of every kind sell heavily. Coke is strong, with the best Connellsville holding to $4.85 Chicago.

Cleveland

Oct. 5—Shipments of iron ore down the Lakes are heavy, and the docks are crowded. It is difficult to get cars enough to relieve the pressure.

Pig Iron—Inquiries are heavy, and many sales are reported. Prices have been advanced sharply and no shading is reported. No. 2 foundry is quoted at $18.25; No. 2 Southern, $17.85; gray forge, $16.25@16.50, all Cleveland delivery.

Finished Material—Demand is active and mills are falling behind on deliveries. Some large contracts have been let. The Upson Nut Company has awarded the contract for the erection of the buildings for its new steel plant to the Riter-Conley Manufacturing Company, Pittsburg. About 750 tons of steel will be required. The open-hearth construction will be by S. R. Smythe & Co., Pittsburg.

Philadelphia

Oct. 6—The volume of pig-iron dealings has not been as great, but the market is extremely strong. Several good lots have been taken by local industries. Virginia furnaces have sold some iron for early delivery, but are reluctant to quote for next year. No. 2X foundry is selling at $18.50@19 for early delivery, with $19.50 named for first-quarter and $20 for second-quarter contracts. Basic is $18.50 for prompt and $19 for first quarter. Forge brings $17.25@17.50 for prompt.

Steel Billets—An active demand has sent prices kiting, $27.50@28.50 being quoted for ordinary billets, while as high as $30 has been done for forging billets.

Bars—Good business has been done at about 1.60c. for refined iron and 1.55@1.60c. for steel bars. Mills do not want to quote on next year.

Plates—Business is a little slower, but still good. More orders are coming to Eastern mills, and they will not name prices for next year, while selling at $1.65 @1.70c. for fourth quarter.

Sheets—The mills are taking business at a fair rate and are quoting a point higher on ordinary gages.

Structural Steel—No heavy contracts this week, but a good total of small orders. Deliveries are falling behind, all the mills being full.

Scrap—The market is strong enough to warm the hearts of dealers, and is still gaining. No. 1 railroad has brought $20.50 @21, and machinery cast $16@16.50. There is a loud call for heavy steel melting scrap, which brings $17.75@18.25. It is understood that large lots of this kind have been bought abroad.

Pittsburg

Oct. 5—Finished-steel products continue to show an advancing tendency. Following the advance in black and galvanized sheets effective Sept. 28, noted in last report, corrugated sheets have been advanced 5c. per square to $1.60 for painted and $2.85 for galvanized, 28 gage.

Effective Oct. 1, the long expected advance in merchant-steel pipe occurred, amounting to one point, or about $1.90 per ton of 2000 lb. The new discount, in large lots to jobbers, is 80 and 5 off list. Steel boiler tubes were at the same time advanced one point, and the manufacturers of charcoal-iron boiler tubes have followed this with an advance of two points in their product. Bars, plates and shapes show a strong tone, but have not realized the advance for first-quarter delivery which was expected. Within the past week bars have sold at 1.40c. for first quarter, and plates at 1.50c., these being prices which were expected to rule only for this year's delivery. The buying of finished-steel products in the past fortnight has not been as heavy as formerly, and more attention is being given to the question of how much of the buying of the past few months represented the replenishing of the greatly decreased stocks in the hands of jobbers and consumers last spring.

Pig Iron—Since last report bessemer pig iron has scored a straight advance of 50c. a ton, to $18.50, Valley, this being the minimum for any delivery, with fully 20,000 tons sold, in various small lots for fourth-quarter and first-half delivery. The bessemer average for September was $17.434, Valley, or $18.334, Pittsburg, $1.20 increase over August, and $2.85 advance over October, 1908, and May, 1909, both months having shown low points at $14.58, Valley. The actual advance during September was from $16.75 at the beginning to $18.50 at the close of the month. The general feeling is that bessemer pig iron has been advancing too rapidly, and the criticism extends to other grades as they have advanced in sympathy, although not so sharply. A lot of 10,000 tons of basic for this year's delivery is reported to have sold at $17.50, Valley, and this, if true, would show a sharp and possibly unsound advance. Foundry iron for this year has advanced to a minimum of $17, Valley, while a sale of 2000 tons was made this week at $17.75, Valley, for first-half delivery. Several furnaces have withdrawn from the market, their idea being all of $20 at furnace, for pig iron for next year. At this rate there will be a great deal of iron to be sold at further increases over the present advanced prices and serious question is raised whether the market will be able to absorb it.

Steel—The market for crude steel is very strong, as there is very little available, mills using their usual surpluses in their own finishing departments. Billets are quotable at $25@25.50 for bessemer and $26@26.50 for open-nearth and sheet-bars at $27@27.50 for bessemer and $28 for open-hearth, f.o.b. maker's mill, Pittsburg district, for early delivery, contracts for forward delivery being usually at an advance.

Ferromanganese—The market continues strong, with an advancing tendency. While odd lots of prompt can sometimes be picked up at $42.50, Baltimore, regular deliveries command $43@45, depending on the period. The freight to Pittsburg is $1.95 per ton.

St. Louis

Oct. 4—The demand for pig iron is heavy, and some large buyers are in the market. Inquiries for large lots have been received this week. Producing companies in general are practically all sold up for this year, and are now holding what little extra they may have to sell at $15 per ton Birmingham, or $18.75 f.o.b. St. Louis. Nearly all the available pig iron for this season is in the hands of jobbers who bought earlier in the season on a speculative basis. The above price is also the prevailing one for delivery for the first quarter of next year. A number of inquiries are on hand for pig for delivery for the first half of next year. The majority of companies are not selling that far ahead, but those who are quote $15 @15.25 per ton f.o.b. Birmingham, or $19 @19.25 per ton f.o.b. St. Louis.

Iron Ore—The market for iron ore remains unchanged at $3.50 per ton f.o.b. St. Louis for 50 per cent. ore. The supply of Missouri ore is increasing and it is reported that some of it is now being shipped to furnaces in Kentucky. Heretofore the entire output has been used locally.

Foreign Iron Trade

British Iron Trade—Exports and imports of iron and steel, and of manufactures, in Great Britain for the eight months ended Aug. 31, are valued by the Board of Trade returns as below:

	Exports.	Imports.	Excess.
Iron and steel	£24,719,988	£ 5,200,805	Ex. £19,519,183
Machinery...	18,764,543	3,148,196	Ex. 15,616,347
New ships....	4,067,536	.....	Ex. 4,067,536
Total..... ..	£47,552,067	£ 8,349,001	Ex. £39,203,066
Total, 1908..	52,155,516	8,251,081	Ex. 43,904,435

The decrease in exports was 8.8 per cent.; increase in imports, 1.2 per cent. The total quantities of iron and steel were, in long tons:

	1908.	1909.	Changes.
Exports.....	2,779,598	2,725,060	D. 54,538
Imports.....	688,574	776,710	I. 88,136

In addition to the above, exports of scrap iron and steel were 87,558 long tons in 1908, and 105,244 in 1909; increase, 17,686 tons. Imports of scrap, 15,490 tons in 1908, and 15,767 in 1909; increase, 277 tons.

British Iron-ore Imports—Imports of iron ore into Great Britain, eight months ended Aug. 31, were 3,914,460 long tons in 1908, and 4,026,942 in 1909; increase, 112,482 tons. Of the imports this year 3,018,697 tons were from Spain.

German Iron Production—The German Iron and Steel Union reports the make of pig iron in Germany and Luxemburg in August at 1,100,671 metric tons, being 9612 tons more than in July, and the largest monthly output reported for two years past. For the eight months ended Aug. 31 the total production was, in metric tons:

	1908.	1909.	Changes.
Foundry iron	1,486,623	1,592,409	I. 105,786
Forge iron.....	451,592	460,189	I. 8,597
Steel pig.....	632,989	716,835	I. 83,846
Bessemer pig.....	269,402	273,473	I. 4,071
Thomas(basic)pig	5,155,330	5,397,786	I. 242,456
Total.....	7,995,936	8,440,692	I. 444,756

The total increase this year was 5.6 per cent. Steel pig includes spiegeleisen, ferromanganese and all similar alloys.

Metal Markets

New York, Oct. 2—The metal markets have been generally rather quiet, with no important changes in quotations. For most metals consumption is on the increase, but supplies are abundant.

Gold, Silver and Platinum

UNITED STATES GOLD AND SILVER MOVEMENT

Metal.	Exports.	Imports.	Excess.
Gold:			
July 1909..	$16,661,782	$ 3,269,885	Exp. $13,391,897
" 1908..	4,845,272	2,949,179	Exp. 1,896,093
Year 1909..	80,496,119	23,405,477	Exp. 57,090,642
" 1908..	58,363,098	29,357,075	Exp. 29,006,172
Silver:			
July 1909..	5,049,366	3,926,117	Exp. 1,123,249
" 1908..	4,930,746	3,039,581	" 1,891,165
Year 1909..	34,409,032	26,798,145	" 7,610,887
" 1908..	30,445,291	24,180,929	" 6,264,362

Exports from the port of New York, week ended Oct. 1: Gold, $200,250, chiefly to Panama; silver, $895,005, chiefly to London. Imports: Gold, $109,725; $43,999, from Mexico, Central and South America.

Movement of gold and silver at the port of San Francisco, eight months ended Aug. 31:

Gold:	Exports.	Imports.	Excess.
Coin.....	$ 5,000	$ 14,373	Imp. $ 9,373
Bullion.....	12,018,412	2,146,242	Exp. 9,872,170
Total gold.	$12,023,412	$2,160,615	Exp. $9,862,797
Silver:			
Coin.....	$171,970	$ 204,351	Imp. $ 32,381
Bullion.....	5,083,238	1,583,448	Exp. 3,499,790
Total silver	$ 5,255,208	$1,787,799	Exp. $3,467,409

Gold exports were almost entirely in June, July and August, and were to Japan.

Gold—The price of gold on the open market in London continued at 77s. 9⅝d. per oz. for bars and 76s. 4⅝d. per oz. for American coin. Russia is still a buyer in the London market, and some gold was also taken for German account. In New York $1,000,000 in gold was engaged for shipment to Japan by way of San Francisco.

Platinum—Business is active and there has been a further advance in the price of the metal. Dealers are now asking $27 per oz. for refined platinum and $30.25 for hard metal. Some offers recently made of metal at lower prices have been withdrawn.

Silver—The silver market has been steady to firm. Supplies have been readily placed at current quotations. The market closes a little higher on reports of Continental buying.

SILVER AND STERLING EXCHANGE

Sept.-Oct.	30	1	2	4	5	6
New York....	51⅜	51⅜	51⅜	51¼	51⅜	51⅛
London.....	23¾	23¾	23¾	23 11/16	23¾	23 13/16
Sterling Ex..	4.8605	4.8605	4.8600	4.8600	4.8600	4.8590

New York quotations, cents per ounce troy, fine silver; London, pence per ounce sterling silver, 0.925 fine.

Exports of silver from London to the East, Jan. 1 to Sept. 23, as reported by Messrs. Pixley & Abell:

	1908.	1909.	Changes.
India.....	£ 6,882,913	£4,596,200	D. £2,286,713
China.....	516,400	1,555,200	I. 1,038,800
Straits.....	112,385	82,800	D. 29,585
Total.....	£ 7,511,698	£6,234,200	D. £1,277,498

Copper, Tin, Lead and Zinc

Sept.-Oct.	Copper. Lake, Cts. per lb.	Copper. Electrolytic, Cts. per lb.	Copper. London, £ per ton.	Tin. Cts. per lb.	Lead. New York, Cts. per lb.	Lead. St. Louis, Cts. per lb.	Zinc. St. Louis, Cts. per lb.
30	13 @13⅜	12⅝ @13	59 5/16	30¾ @30⅞	4.32½ @4.35	4.20 @4.22½	5.77½ @5.80
1	13 @13¼	12⅝ @13	59	30¼	4.32½ @4.35	4.20 @4.22½	5.77½ @5.80
2	13 @13⅜	12⅝ @12⅞	....	30⅜	4.32½ @4.35	4.20 @4.22½	5.77½ @5.80
4	13 @13¼	12⅝ @12⅞	58 15/16	30⅜	4.32½ @4.35	4.20 @4.22½	5.80 @5.82½
5	13 @13¼	12⅝ @12⅞	58 3/16	30⅝	4.32½ @4.35	4.20 @4.22½	5.82½ @5.85
6	13 @13¼	12⅝ @12⅞	58	30½	4.32½ @4.35	4.20 @4.22½	5.82½ @5.85

London quotations are per long ton (2240 lb.) standard copper. The New York quotations for electrolytic copper are for cakes, ingots and wirebars, and represent the bulk of the transactions made with consumers, basis, New York, cash. The prices of casting copper and of electrolytic cathodes are usually 0.125c. below that of electrolytic. The quotations for lead represent wholesale transactions in the open market. The quotations on spelter are for ordinary Western brands; special brands command a premium.

Copper—The market during the past week has been more or less affected by the conditions in London, where a fall in the speculative price of standard has developed, owing nominally to the reported large increase in visible stocks. Some sales of considerable quantities of copper from second hands in New York also had an unfavorable effect. Producers have not been pressing copper for sale, but there has been some unloading by speculators who seem to have been unable to carry their holdings longer, and were compelled to drop them at a shade below the current quotations. Moreover, there is now a disposition to await the statistical figures, which are expected to disclose a further increase in the stocks in this country. The fortnightly statistics published in London show an increase in the visible supply on the other side of 3500 tons. The close is easy at 13@13¼c. for Lake copper, and 12¾@12⅞c. for electrolytic copper in cakes, wirebars, or ingots. Casting copper is quoted nominally at 12⅝@12¾ cents.

Copper sheets are 17@18c., base for large lots. Full extras are charged, and higher prices for small quantities. Copper wire is 14½c. base, carload lots at mill. Business continues on a good scale.

The standard market in London has suffered throughout the week from the realization of holdings of tired-out speculators, and as a result has crumbled away from day to day, closing practically at the lowest point, £58 for spot and £58 17s. 6d. for three months.

Refined and manufactured sorts we quote: English tough, £62; best selected, £61@62; strong sheets, £73@74 per ton.

Imports of copper for the week from New York and Philadelphia were 1968 long tons. Our special correspondent gives the exports from Baltimore at 4164 tons of copper. Copper exports from the United States in September are estimated at 20,060 long tons.

Visible stocks of copper in Great Britain and France on Oct. 1—including 8200 tons afloat from Chile and Australia—were 93,850 tons, an increase of 3460 tons over the Sept. 15 report.

Tin—The London market has been irregular, declining after the Banka sale and again quickly advancing toward its former basis. The decline toward the end of last week caused a good deal of interest in the domestic market, and no doubt the orders which were sent from here to the other side caused the subsequent advance abroad. The close is somewhat easier abroad, while more anxiety is shown here to market tin and in some instances prices below the import point have been accepted. London is cabled at £139 5s. for spot and £140 7s. 6d. for three months, while the domestic market may be quoted at 30½@30⅝ cents.

Tin output of the Federated Malay States, eight months ended Aug. 31, was 33,385 long tons in 1908, and 31,115 in 1909; decrease, 2270 tons.

Visible stocks of tin Oct. 1, in long tons, were:

	In Store.	Afloat	Total.
London.....	7,410	4,988	12,398
Holland.....	2,539	187	2,726
U. S., exc. Pacific ports....	3,537	2,758	6,295
Total.....	13,486	7,933	21,419

The total shows an increase of 2237 tons over the Sept. 1 report.

Lead—The market is quiet and unchanged at 4.32½@4.35c. New York, and 4.20@4.22½c. St. Louis.

The London market is again higher, the close being cabled at £13 5s. for Spanish, and £13 7s. 6d. for English lead.

Spelter—Business in this metal has again been on a relatively very large scale. The old stocks which had been overhanging the market for so long a period are said to have been entirely distributed, and as the current consumption appears to be in excess of the output, the course of the market should cause no surprise. The close is strong and advancing at 5.97½@6c. New York, and 5.82½@5.85c. St. Louis.

New York quotations for spelter Sept. 30-Oct. 2, inclusive, were 5.92½@5.95c.; Oct. 4, 5.95@5.97½c.; Oct. 5 and 6, 5.97½@6 cents.

The London market has also advanced, the close being cabled at £23 5s. for good ordinaries and £23 10s. for specials.

Base price of sheet zinc is 7½c. per lb., f.o.b., LaSalle-Peru, Ill., less 8 per cent. discount.

Other Metals

Antimony—Business is dull and prices unchanged at 8⅝@8¾c. for Cookson's; 8⅜c. for Hallett's; 8@8¼c. for U. S., and 7⅝@7⅞c. for outside brands.

Aluminum—No change can be reported. No. 1 ingots can be had at 20@23c. per lb. in large lots, with the American maker holding to the higher figure.

Quicksilver—The demand is good and prices are firm at the recent advance. New York quotations are $46 per flask of 75 lb., with jobbers asking 63@65c. per lb. for small lots. San Francisco prices hold at $44@45 for domestic orders and $42 @43 for export. The London price is now £8 7s. 6d., with second hands selling at £8 6s. per flask.

Magnesium—The price of pure metal is $1.50 per lb. for 100-lb. lots f.o.b. New York.

Nickel—Large lots, contract business, 40@45c. per lb. Retail spot, from 50c. for 2000-lb. lots, up to 55c. for 500-lb. lots. The price for electroyltic is 5c. higher.

Cadmium—Current quotations are 75c. per lb. in 100-lb. lots at Cleveland, Ohio. In Germany 450@475 marks per 100 kg. at factory in Silesia.

Imports and Exports of Metals

Exports and imports of metals in the United States, seven months ended July 31, are reported as follows, in the measures usual in the trade.

Metals:	Exports.	Imports.	Excess.
Copper, long tons	188,480	83,667	Exp. 104,813
Copper, 1908....	191,868	43,370	Exp. 148,428
Tin, long tons....	265	25,037	Imp. 24,772
Tin, 1908.....	142	20,359	Imp. 20,217
Lead, short tons.	59,100	68,619	Imp. 9,519
Lead, 1908.....	41,636	61,591	Imp. 19,955
Spelter, sh. tons.	2,219	3,054	Imp. 835
Spelter, 1908....	1,991	261	Exp. 1,730
Nickel, lb.	6,942,984	11,953,841	Imp. 5,010,857
Nickel, 1908....	6,736,938	10,067,112	Imp. 3,330,174
Antimony, lb.....	6,648	6,270,943	Imp. 6,264,295
Antimony, 1908.		4,648,253	Imp. 4,648,253
Platinum, oz.....	... .	62,554	Imp. 62,554
Platinum, 1908.		18,276	Imp. 18,276
Quicksilver, lb	176,810	.....	Exp. 176,810
Quicksilver, '08	105,674	.....	Exp. 105,674
Aluminum, value	$218,361	.....	Exp. $218,361
Aluminum, 1908	219,345	.....	Exp. 219,345
Ores, etc.:			
Zinc oxide, lb. ..17,122,097		.....	Exp.17,122,097
Zinc oxide, '08..15,001,413		.....	Exp.15,001,413
Zinc dross, lb....11,782,224		.....	Exp.11,782,224
Zinc dross, '08..12,627,926		... .	Exp.12,627,926
Zinc ores, lg.tons	8,094	67,875	Imp. 59,781
Zinc ores, 1908.	16,728	26,590	Imp. 9,862
Antim'y ores, lb.	504	3,386,708	Imp. 3,386,204
Ant. ores, 1908.	.....	709,769	Imp. 709,769
Chrome ore, tons	.....	19,676	Imp. 19,676
Chrome ore, '08	.....	.....	.....

Copper, lead and nickel include the metal contents of ores, matte, bullion, etc. The exports given include reëxports of foreign material. Chrome ore was not reported separately last year.

British Metal Imports and Exports

Imports and exports of metals in Great Britain, eight months ended Aug. 31, figures in long tons, except quicksilver, which is in pounds:

Metals:	Imports.	Exports.	Excess.
Copper, long tons	111,844	40,903	Imp. 70,941
Copper, 1908....	113,901	42,352	Imp. 71,549
Tin, long tons....	27,024	27,209	Exp. 185
Tin, 1908.....	30,070	27,240	Imp. 2,830
Lead, long tons..	139,744	31,858	Imp. 107,886
Lead, 1908	156,206	35,288	Imp. 120,918
Spelter, l'g. tons.	73,687	5,063	Imp. 68,624
Spelter, 1908....	70,483	5,288	Imp. 65,195
Quicksilver, lb...	2,998,551	666,572	Imp. 2,331,979
Quicksilver, '08	3,069,698	1,087,946	Imp. 1,981,752
Ores:			
Tin ore and con.	16,427	.....	Imp. 16,427
Tin ore, 1908...	17,722	... .	Imp. 17,722
Pyrites	518,690	.....	Imp. 518,690
Pyrites, 1908...	547,976	... .	Imp. 547,946

Copper totals include metallic contents of ore and matte. Exports include reexports of foreign material. Of the imports in 1909 the United States furnished this year 180 tons copper matte, 44,890 tons fine copper and 23,519 tons lead.

Zinc and Lead Ore Markets

Joplin, Mo., Oct. 2—The highest settling price of the week was $52 per ton for zinc sulphide ore, the base ranging from $46 to $49 per ton of 60 per cent. zinc. One bin sold for next week's delivery on a $49.50 base. Zinc silicate sold as high as $30, on a base of $23@25 per ton of 40 per cent. zinc. The average price, all grades, was $44.76. No lead ore was reported sold higher than $55.50. The market continues weak, with only two companies buying. The average price, all grades, was $55.28 per ton.

A large tonnage of zinc ore has accumulated which is held for a $50 base price, and aside from this is a tonnage of ore produced in excess of what the smelters have been shipping. The total ore in bins is approximately 7600 tons, of which about 3500 tons is withheld from the market on present prices.

SHIPMENTS, WEEK ENDED OCT. 2.

	Zinc, lb.	Lead, lb.	Value.
Webb City-Carterville	3,666,100	466,160	$ 99,088
Joplin.....	1,896,890	275,650	53,174
Duenweg.....	768,850	75,250	18,516
Miami.....	643,700	273,100	18,451
Aurora.....	636,420	.....	11,452
Galena.....	416,570	33,810	10,182
Carthage.....	406,620	.....	10,165
Alba-Neck.....	368,340	.....	9,208
Zincite.....	355,170	.....	8,879
Prosperity.....	209,990	112,450	8,054
Badger.....	286,900	8,260	7,108
Oronogo.....	242,050	3,780	5,019
Spurgeon.....	157,940	72,260	4,571
Quapaw.....	199,430	4,070	4,323
Granby	218,980	7,500	3,350
Cave Springs.....	125,650	.....	2,952
Carl Junction.....	63,910	.....	1,598
Sarcoxie.....	58,840	.....	1,382
Stott City.....	56,740	.....	1,333
Peoria.....	70,230	.....	877
Totals	10,849,320	1,332,290	$279,682
40 weeks.....	450,556,400	68,038,150	$10,674,606

Zinc value, the week, $242,854; 40 weeks, $8,819,299
Lead value, the week, 36,828; 40 weeks, 1,855,297

MONTHLY AVERAGE PRICES.

Month.	Zinc Ore. Base Price.		Zinc Ore. All Ores.		Lead Ore. All Ores.	
	1908.	1909.	1908.	1909.	1908.	1909.
January.....	$37.60	$41.25	$35.56	$38.46	$46.88	$52.17
February....	36.63	36.94	34.92	34.37	49.72	50.50
March.....	36.19	37.40	34.19	34.71	49.90	50.82
April	35.40	38.63	34.08	37.01	52.47	55.63
May	34.19	40.06	33.39	37.42	56.05	56.59
June.....	33.06	44.15	32.07	40.35	60.48	57.52
July	34.55	43.06	31.67	41.11	59.90	53.74
August	36.53	48.25	33.42	44.54	60.34	57.60
September ..	37.63	47.70	34.44	44.87	54.59	56.11
October.....	35.95	.....	33.28	.....	52.63	.....
November...	39.13	.....	35.02	.....	54.53	.....
December...	42.75	.....	39.63	.....	49.68	.....
Year.....	$36.63	.....	$34.31	.....	$53.93	.....

NOTE—Under zinc ore the first two columns give base prices for 60 per cent. zinc ore; the second two the average for all ores sold. Lead ore prices are the average for all ores sold.

Platteville, Wis., Oct. 2—The top price paid this week for zinc ore was $49; the base price, 60 per cent. zinc, was $48.50 per ton. The base price of lead ore was $56@57 per ton.

SHIPMENTS, WEEK ENDED OCT. 2.

Camps.	Zinc ore, lb.	Lead ore, lb.	Sulphur ore, lb.
Platteville.....	569,690	147,000	292,400
Cuba City.....	556,130	74,605	140,130
Highland.....	502,300	80,000	.....
Hazel Green.....	417,800	.....	.....
Benton.....	308,820	.....	141,400
Livingston.....	160,000	.....	.....
Harker.....	146,160	.....	.....
Linden.....	131,290	.....	.....
Rewey.....	127,000	.....	.....
Galena.....	88,000	.....	.....
Strawbridge.....	80,000	.....	.....
Days Siding.....	80,000	.....	. ....
Shullsburg.....	.....	80,000	.....
Total.....	3,167,190	381,605	573,930
Year to Oct. 2.....	103,587,200	6,549,855	9,845,845

In addition to the above there was shipped to the American Zinc Ore Separating Company, 587,700 lb., and to the Joplin Separator Works, 358,500 lb. zinc concentrates.

Chemicals

New York, Oct. 6—The markets show little or no change since last week's report. Outside of contract business trading was rather light and prices are generally stationary.

Copper Sulphate—Business is not especially active, but quotations are maintained at $4.10 per 100 lb. for carload lots and $4.35 per 100 lb. for smaller parcels.

Arsenic—There has been little business during the week. Quotations for white arsenic are 2.70@2.75c. per lb. for spot, while 2⅞c. per lb. is asked for next year's delivery. A new company has been organized to work the deposits at Brinton, Va., and to manufacture the arsenic into paris green and other products at Norfolk.

Nitrate of Soda—The market is quiet, with quotations at 2.10c. per lb. for both spot and futures.

Potash Salts—Berlin despatches report that the Kali-Syndikat has been finally disrupted, owing to the secession of the Sollstedt and Aschersleben mines, which have large contracts with American consumers, and the Einigkeit mine, which is controlled by the Virginia-Carolina Chemical Company. The other producers, it is reported, will continue to act together,

Mining Stocks

New York, Oct. 6—The general stock market has been moderately active though still largely a professional market. The celebrations in New York last week had some effect in decreasing activity. As a whole, the quotations have been fairly steady, some reactions being balanced by exceptional activity in a few stocks. Chief among these was Steel common, which reached a high point during the week at 94⅞, but reacted sharply and unexpectedly to 90 yesterday.

The Curb market was irregular, being active in spots. The copper stocks were in fair demand and generally maintained quotations, although there were declines in Boston Copper, British Columbia and Cumberland-Ely. The Cobalt shares were generally firm on moderate trading. The Nevada gold stocks were out of the running, being dull, though without any notable losses in price. Industrial stocks were not in any special demand. Southern Iron and Steel was steady, but Standard Oil was lower.

Boston, Oct. 5—Copper shares continue disappointing and today saw a sharp decline, following the weakness in New York stocks due to the Steel Corporation episode. Prices in the main have held fairly steady the past week, while specialties have been both active and firm at times.

A splendid opportunity was lost today to gather a little strength and create quite

a little movement in coppers. Word received this morning told that the long sought for lode had been encountered at the 5th level and that it came in good. The first result was to put Lake Copper stock up to $38.50, its record price. It closed at $37, however, and the hope is that the opportunity has not been lost to make it a market factor. A short selling movement caused a small decline in Utah Consolidated to $43. Osceola spurted from $151.50 to $160, but reacted to $156. U. S. Coal and Oil moved up $3 to $37.25. The company's annual report showed the equivalent of $2 earned on the 120,000 shares of stock. It carried $200,000 to surplus after apportioning $63,000 for depreciation. American Zinc rose $2.37½ to $35.12½ and has been a strong feature all the week. This company's annual report showed earnings of $3 on the outstanding 80,000 shares of stock, but the money was put into betterments and additions.

Amalgamated Copper prices have followed those of New York pretty closely, the extremes for the week being $84.50 and $82.12½, with the final tonight at the last named. North Butte has held a firm front, although it broke to $60 today. Greene-Cananea had a rise to $10.62½.

On the Curb prices have shown little variation. Davis-Daly affairs are yet mixed, but the advent of two Boston brokerage firms into soliciting proxies adds to the strength of the Jarvis-Erb committee. First National has shown a good degree of strength.

STOCK QUOTATIONS

NEW YORK	Oct. 6
Name of Comp.	Clg.
Alaska Mine	‡.11
Amalgamated	82
Anaconda	48¼
Balakiala	‡2⅛
British Col. Cop.	6¼
Buffalo Mines	3½
Butte Coalition	25½
Colonial Silver	‡⅛
Cum. Ely Mining	7 1/16
Davis-Daly	6
Dominion Cop.	7
Douglas Copper	1
El Rayo	2 7/16
Florence	2 15/16
Foster Cobalt	‡.32
Furnace Creek	‡.05
Giroux	9⅛
Gold Hill	⅛
Goldfield Con.	6⅝
Granby	95
Greene Gold	‡⅛
Greene G. & S.	‡9
Guanajuato	2⅛
Guggen. Exp.	215
Hanapah	‡15
Kerr Lake	9⅛
McKinley-Dar.	.91
Miami Copper	15¾
Micmac	1/16
Mines Co. of Am.	⅛
Montezu. of C. R.	16
Mont. Sho. C.	1⅞
Nev. Utah M. & S.	1 3/16
Newhouse M. & S.	3⅛
Nipissing Mines	11⅞
Old Hundred	⅛
Silver Queen	.35
Stewart	7/16
Tennessee Cop'r	36
Tri-Bullion	¾
United Copper	10
Utah Apex	‡4⅛
Utah Copper	49
Yukon Gold	5 3/16

‡Last quotation.

BOSTON	Oct. 6
Name of Comp.	Clg.
Adventure	6
Allouez	58
Am. Zinc	34¼
Arcadian	4½
Arizona Com.	45½
Atlantic	8¾
Boston Con.	15
Calumet & Ariz.	103
Calumet & Hecla	665
Centennial	40
Copper Range	79½
Daly-West	8½
East Butte	11½
Franklin	17¾
Greene—Can.	10¼
Hancock	10
Isle Royal	24
Keweenaw	2⅝
La Salle	15
Mass	7
Michigan	10¼
Mohawk	61¾
Nevada	24½
North Butte	59¾
Ojibway	8¼
Old Colony	.65
Old Dominion	.54
Osceola	156
Parrot	31¼
Quincy	88
Rhode Island	‡4¾
Shannon	16
Superior	57
Superior & Bost.	15¾
Superior & Pitts.	15¾
Tamarack	70
Trinity	12
U. S. Smg. & Ref.	56½
U.S.Sm. & Re., pd.	53
Utah Con.	43¾
Victoria	3¾
Winona	7½
Wolverine	150
Wyandotte	2⅛

‡Last quotation.

N. Y. INDUSTRIAL	
Am. Agri. Chem.	46½
Am. Smelt. & Ref.	98⅜
Am.Sm. & Ref., pf.	112⅛
Colo. Fuel & Iron.	44⅝
Federal M. & S., pf.	90
National Lead	89¼
National Lead, pf.	‡111
Pittsburg Coal	18½
Republic I. & S.	45½
Republic I. & S., pf.	106½
Sloss-Sheffield	92
Standard Oil	‡685
U. S. Steel	90⅛
U. S. Steel, pf.	128¾
Va. Car. Chem.	46½

BOSTON CURB	Low.
Ahmeek	225
Chemung	16
Chino	7⅞
Gila	8¾
Indiana	5¾
Mason Valley	2
Ray Central	2⅛
Ray Con.	19¾
San Antonio	8
Yuma	1¾

Furnished by Hornblower & Weeks, N. Y.

ST. LOUIS	Oct. 2	
N. of Com.	High.	Low.
Adams	.40	.30
Am. Nettie	.09	.07
Center Cr'k	1.80	1.60
Cent. C. & C.	84.00	83.00
C. C. & C. pf.	83.00	82.00
Cent. Oil	115.00	100.00
Columbia	9.00	7.00
Con. Coal	18.00	17 00
Doe Run	‡15.00	105.00
Gra. Bimet.	.30	.25
St. Joe	12.50	11.00

LONDON	Oct. 6
Name of Com.	Clg.
Dolores	£1 5s 0d
Stratton's Ind.	0 3 3
Camp Bird	1 10 0
Esperanza	3 0 7½
Tomboy	1 0 0
El Oro	1 5 6
Oroville	0 14 0

Cabled through Wm. P. Bonbright & Co., N. Y.

NEVADA STOCKS. Oct. 6.
Furnished by Weir Bros. & Co., New York.

Name of Comp.	Bid.
COMSTOCK STOCKS	
Belcher	.88
Best & Belcher	59
Caledonia	.41
Challar	.28
Comstock	‡.28
Con. Cal. & Va.	1.37
Crown Point	.86
Exchequer	.29
Gould & Curry	.23
Hale & Norcross	.58
Mexican	1.42
Ophir	1.27
Overman	.75
Potosi	.60
Savage	.55
Sierra Nevada	.54
Union	.73
Utah	.05
Yellow Jacket	1 37
TONOPAH STOCKS	
Belmont	.75
Extension	.55
Golden Anchor	...
Jim Butler	.11
MacNamara	.28
Midway	.18
Montana	.95
North Star	.02
Tono'h Mine of N.	6.62½
West End Con.	.25
GOLDFI'D STOCKS	
Adams	.01
Atlanta	.11
Blue Bell	.02
Booth	.09
C.O.D. Con.	.07
Columbia Mt.	.07
Comb. Frac.	.70
Cracker Jack	.02
Dia'dfield B. B. C.	.01
Florence	2.92½
Goldfield Belmont	.04
Goldfield Daisy	.07
Great Bend	.04
Jumbo Extension	.14
Kendall	.02
Lone Star	.02
May Queen	.04
Oro	.04
Red Hill	.04
Sandstorm	.05

Name of Comp.	Bid.
Silver Pick	.11
St. Ives	05
Triangle	.01
BULLFROG STOCKS	
Gibraltar	02
Homestake King.	‡ 01
Mont. Shoshone C.	1 75
Tramp Cons.	.04
MISCELLANEOUS	
Cumberland Ely.	6.93¾
Giroux	9.00
Greenwa'r Copper	.03
Nevada Con.	23.75
Nevada Hills	.70
Navada Smelting.	.87½
Nevada Wonder	60
Nevada-Utah	1 68¾
Penn-Wyoming	...
Pittsburgh S. Pk.	65
Ray Central	2.06½
Ray Con.	19.00
Round Mt. Sphinx	05

COLO. SPRINGS	Oct. 1
Name of Comp.	Clg.
Acacia	.07¼
C. C. Con.	.03¼
Doctor	.09
Elkton	.74¼
El Paso	.63½
Findlay	.12½
Gold Dollar	.13½
Gold Sovereign	.04¾
Isabella	.18
Jack Pot	‡.08½
Jennie Sample	.07¾
Jerry Johnson	.06¾
Lexington	‡.01¾
Mary McKinney	.46¼
Old Gold	.04¾
Pharmacist	‡.03⅞
Portland	.83½
U. G. M.	‡.08
Vindicator	.74
Work	‡.07

Assessments

Company.	Delinq.	Sale.	Amt.
Alta Gladstone, Utah	Sept. 15	Oct. 20	$0.00½
Black Traveler Copper, Ida.	Sept. 27	Oct. 27	0.005
Brunswick Con. Va., Nev.	Oct. 1	Oct. 22	0.02
Bullion, Nev.	Oct. 7	Oct. 25	0.05
Caledonia, Nev.	Oct. 21	Nov. 11	0.10
Challenge Con., Nev	Sept. 28	Oct. 18	0.10
Dennemora G. & C., Ida.	Oct. 1	Oct. 18	0.001½
Dominion, Ida.	Sept. 20	Nov. 20	0.002
East Buffalo, Ida.	Sept. 10	Oct. 10	0.000½
Hale & Norcross, Nev.	Sept. 21	Oct. 11	0.10
Hancock Con., Mich.	Oct. 10	.....	1.00
Julia Con., Nev.	Oct. 14	Nov. 8	0.03
Pawhattan, Ida.	Oct. 7	Nov. 8	0.001
San Antonia Copper, Mex.	Dec. 1	.....	1.00
Sheba G. & S. Mining, Utah	Sept. 28	Oct. 30	0.05
Sierra Nevada, Nev.	Oct. 12	Nov. 3	0.10
Silver King Con., Utah	Oct. 4	Oct. 23	0.10
So. Columbus Con., Utah	Sept. 20	Oct. 20	0.000½
Square Deal M. & M., Ida.	Oct. 14	Nov. 4	0.001
St. Louis, Nev.	Oct. 22	Nov. 12	0.01
Utah, Nev.	Oct. 26	Nov. 16	0.05

Monthly Average Prices of Metals

SILVER

Month.	New York.		London.	
	1908.	1909.	1908.	1909.
January	55.678	51.750	25.738	23.834
February	56.000	51.472	25.855	23.706
March	55.365	50.468	25.570	23.227
April	55.505	51.428	25.133	23.708
May	52.795	52.905	24.377	24.343
June	53.663	52.538	24.760	24.166
July	53.115	51.043	24.514	23.519
August	51.683	51.125	23.858	23.588
September	51.720	51.440	23.877	23.743
October	51.431	.....	23.725	.....
November	49.647	.....	22.933	.....
December	48.766	.....	22.493	.....
Total	52.864	.....	24.402	....

New York, cents per fine ounce; London, pence per standard ounce.

COPPER

	NEW YORK.				LONDON.	
	Electrolytic		Lake.			
	1908.	1909.	1908.	1909.	1908.	1909.
January	13.726	13.893	13.901	14.280	62.386	57.688
February	12.905	12.949	13.098	13.295	58.786	61.198
March	12.704	12.387	12.875	12.826	58.761	56.281
April	12.743	12.56½	12.928	12.93¾	58.331	57.363
May	12.598	12.893	12.788	13.238	57.387	59.338
June	12.675	13.214	12.877	13.548	57.842	59.627
July	12.702	12.880	12.933	13.363	57.989	58.556
August	13.462	13.007	13.639	13.296	60.500	59.393
September	13.388	12.870	13.600	13.210	60.338	59.021
October	13.354	.....	13.646	.....	60.139	....
November	14.130	.....	14.386	.....	63.417	.....
December	14.111	.....	14.411	.....	62.943	.....
Year	13.208	.....	13.424	.....	59.902	.....

New York, cents per pound. Electrolytic is for cakes, ingots or wirebars. London, pounds sterling, per long ton, standard copper.

TIN AT NEW YORK

Month.	1908.	1909.	Month.	1908.	1909.
January	27.380	28.060	July	29.207	29.125
February	28.978	28.290	August	29.942	29.966
March	30.577	28.727	September	28.815	30.293
April	31.702	29.445	October	29.444	....
May	30.015	29.225	November	30.348	.....
June	28.024	29 322	December	29.154	...
			Av. year	29.465	....

Prices are in cents per pound.

LEAD

Month.	New York.		St. Louis	London.	
	1909.	1909.	1909.	1908.	1909.
January	3.691	4.175	4.025	14.469	13.113
February	3.725	4.018	3.868	14.250	13.313
March	3.838	3.986	3.835	13.975	13.438
April	3.993	4.168	4.051	13.469	13.297
May	4.253	4.287	4 214	12.938	13.226
June	4.466	4.350	4.291	12.600	13.031
July	4.744	4.321	4.188	13.000	12.563
August	4.580	4.363	4.227	13.375	12.475
September	4.515	4.342	4.215	13.125	12.781
October	4.351	.....	.....	13.375	.....
November	4.330	.....	.....	13.538	.....
December	4.213	.....	.....	13.156	.....
Year	4.200	.....	.....	13.439	.....

New York and St. Louis, cents per pound. London, pounds sterling per long ton.

SPELTER

Month.	New York.		St. Louis.		London.	
	1908.	1909.	1908.	1909.	1908.	1909.
January	4.513	5.141	4.363	4.991	20.563	21.425
February	4.788	4.889	4.638	4.739	20.875	21.563
March	4.665	4.757	4.527	4.607	21.075	21.438
April	4.645	4.965	4.495	4.815	21.344	21.531
May	4.608	5.124	4.458	4.974	19.906	21.975
June	4.543	5.402	4.393	5.252	19.000	22.000
July	4.485	5.402	4.338	5.252	19.031	21.969
August	4.702	5.729	4.556	5.579	19.350	22.125
September	4.769	5.796	4.619	5.646	19.563	22.906
October	4.801	.....	4.651	.....	19.750	....
November	5.059	.....	4.909	.....	20.875	.....
December	5.137	.....	4.987	.....	20.625	.....
Year	4.726	.....	4.578	.....	20.163	...

New York and St. Louis, cents per pound. London, pounds sterling per long ton.